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STANFORD'S COMPENDIUM

OF

GEOGRAPHY AND TRAVEL

FOR GENERAL READING

BASED ON HELLWALD'S 'DIE ERDE UND IHRE VÖLKER

TRANSLATED BY A. H. KEANE, M.A.I.

STANFORD'S

COMPENDIUM OF GEOGRAPHY AND TRAVEL

BASED ON HELLWALD'S 'DIE ERDE UND IHRE VÖLKER.'

EUROPE

BY

F. W. RUDLER, F.G.S., AND GEO. G. CHISHOLM, B.Sc.

EDITED BY

SIR ANDREW C. RAMSAY, LL.D., F.R.S.

£3604

WITH

ETHNOLOGICAL APPENDIX

BY A. H. KEANE, M.A.I.

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MAPS AND ILLUSTRATIONS

LONDON

EDWARD STANFORD, 55, CHARING CROSS, S.W.

1885

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Printed by EDWARD STANFORD, *55 Charing Cross, London, S.W.*

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THE volume on Europe in the "Compendium of Geography and Travel" is based, like the other volumes of this series, on Von Hellwald's well-known work entitled *Die Erde und ihre Völker*. A careful translation of the section on Europe was, in the first place, prepared by Mr. Keane, but it was soon found that the original work was in many ways unsuited to take its place by the side of the other volumes of this Compendium. The translation was therefore submitted to Sir A. C. Ramsay, but as its detailed revision required more time than he could conveniently bestow upon it, the work was handed over to Mr. Rudler and Mr. Chisholm. Sir Andrew, however, corrected the proofs of the entire translation, and made extensive additions to the work, adding chapters on such subjects as the Physical History of the Mediterranean, the Valley of the Po, and other topics in which he was specially interested.

After mature consideration it was found desirable to recast a great part of the original work. The plan of the volume has thus been rendered more systematic, and a large portion of the Physical part has been rewritten. The second part of the volume, descriptive of the political and social condition of the several European States, has not been subjected to equally extensive modification. It is desirable to explain that for all estimates of national character the original author is alone re-

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London: Edward Stanford, 55, Charing Cross.

Stanford's Geog^l Estab^t London

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sponsible. If the references to the Germans seem in any way disparaging, it must be remembered that they are the remarks of a German himself. Even in regard to the natives of our own islands, it has been considered well to allow the original passages to stand almost without alteration, since it is always of interest to learn how our national idiosyncrasies are viewed by a foreigner.

A valuable essay on European ethnology and philology has been contributed, in the shape of an Appendix, by Professor Keane. An alphabetical list of the races and languages of Europe, comprising several thousand entries, had been prepared, but, although this would have made the ethnological appendix much more complete, lack of space has unfortunately compelled its omission. It is hoped, however, that this Catalogue, with others prepared by the same ethnologist, will soon be issued in another form.

The exigencies of space have also led to the omission, in most cases, of statistical data from the body of the book. The statistics have, however, been collected by Mr. Chisholm in the form of an Appendix, where they will probably be more convenient for reference than if they had been incorporated in the text.

Throughout the work great care has been taken to ensure accuracy, and to present the latest additions to our knowledge of the various subjects under discussion. Equal care has been taken in the preparation of the series of maps, which will, it is hoped, be found valuable accompaniments to the text.

LONDON, *December* 1884.

POSTSCRIPT.

WHILE the sheets of this work were being printed off Professor A. Geikie, the Director-General of the Geological Survey, contributed to *Nature* (November 13, 1884) an article, accompanying a Report by Messrs. Peach and Horne, in which he considerably modifies the views regarding the structure of the Scottish Highlands previously held by the Survey. He finds the "evidence altogether overwhelming against the upward succession which Murchison believed to exist in Eriboll from the base of the Silurian strata into an upper conformable series of schists and gneisses." The effect of this modification is to refer more of the metamorphic area of the Highlands to the Archæan series than had previously been admitted by the Survey. At the same time the Director-General holds that much of the Highland area has been metamorphosed since Silurian times.

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PHYSICAL MAP OF EUROPE

London, Edward Stanford, 55, Charing Cross S.W.

EUROPE.

PART I.

PHYSICAL DESCRIPTION.

CHAPTER I.

INTRODUCTION.

1. *Situation, Boundaries, and Outline.*

It is the course of history rather than the nature of its geographical features that has caused the portion of the earth's surface to which the name of *Europe* is given to be regarded as a separate division of the land, with the rank of a continent. Historical developments, and the resultant social and political contrasts between it and the adjoining continents, have made this point of view so inevitable that it would be impossible to degrade Europe from its continental rank. The mere fact that this division of the globe contains on the whole a much denser population than any other of the great divisions—upwards of 80 as against less than 50 per square mile in Asia—is one that implies reasons sufficient for considering it by itself, as a distinct rival of the other land-masses holding the dignity of continents. Yet when we regard it strictly from a geographical point of view, it is important to bear in mind that Europe is, after all, only a peninsula of Asia. Physical

configuration, climate, the character of the vegetable and animal life, are all circumstances that bring the continuity of Europe and Asia so much into prominence, that it has sometimes been found useful to adopt the term *Eurasia* as a designation for Europe and Asia combined.

For the reasons just indicated, there is always something more or less arbitrary in fixing the boundaries between Europe and Asia; and usually these boundaries are the result of a compromise between physical and political considerations. In the north-east the Ural Mountains seem to form a sufficiently satisfactory physical boundary; but we must note that this boundary is transgressed by the governments of Perm and Orenburg, which belong politically to Russia in Europe. Farther to the south the Ural River is regularly taken as the boundary: yet this is in disregard of the entire similarity of physical features and ethnological characteristics on the two sides of what is really an unimportant river. In fact, while the Ural Mountains and the Ural River constitute a convenient line of demarcation between the two continents, it is important to observe that a better physical boundary is presented by that area of depression which is shown on our orographical map as beginning in the south-east to the west of the Caspian Sea, and which is continued on the other side of the higher ground at the southern end of the Urals, northwards through Siberia at a higher level along the valleys of the Tobol and the Obi, considerably to the east of the Ural Mountains. It is highly probable that at one time the whole of this area was invaded by the sea, and Europe thus completely severed from the Asiatic continent.

In the extreme south-east the water-parting of the Caucasus Mountains is usually taken as the boundary between Asia and Europe; but, for both political and physical reasons, it is much more convenient to adopt as

the dividing-line that depression which is traversed by the Manich, a tributary of the Don. It is this that will be assumed as the boundary in the present work, as it is also in the volume on ASIA, in which will be found an account of the whole of the Lieutenancy of the Caucasus.

While Europe is, next to Australia, the smallest of the primary divisions of the earth, no other great section of the globe can compare with it either in the variety of its configuration or in the relative extent of its outlines. It has been estimated by Strelbitsky that the coast-line of the European continent, exclusive of the islands, measures as much as 47,790 miles, which gives a ratio of 1 mile of coast to about 75 square miles of area.

The advantages which this structure presents as a means of facilitating commercial intercourse hardly need to be pointed out; but it is a no less important consideration that the varied outline of Europe, together with its diversity of surface, has given rise to several centres of civilisation, independently developed in their physical seclusion from intervening regions. For nowhere else do we meet with such marked peninsular formations, no vast uninterrupted tracts of land occurring anywhere except in the east. And these very eastern regions are all comprised within the limits of one political State—the vast empire of the Russian Slavs; while all the other European nations are crowded together in what remains of the continent.

2. *European Seas—Physical History of the Mediterranean, etc.*

As a consequence of the varied outline of Europe, and of its situation with regard to Asia and Africa, it has both on the north and on the south a number of land-

locked or nearly land-locked seas. In the south there is the Mediterranean, with its gulfs and communicating seas; in the north, the Baltic and its gulfs, and the more open North Sea.

The *Mediterranean*,—from the most ancient times a mighty high-road of civilisation in the strictest sense, the water-way between the nations dwelling on its shores, north and south, east and west, now also part of the great highway between Europe and Eastern Asia,—is of all these the most important. No other sea, indeed, has hitherto played a more brilliant or more weighty part in the history of mankind. It was the "Great Sea" of the sacred writers. By the ancient Romans it was sometimes familiarly termed *Mare Nostrum*, "Our Sea," and sometimes *Mare Internum*, "the Inner Sea," to distinguish it from the great ocean that lay outside "the pillars of Hercules," or the two rocks on opposite sides of the Strait of Gibraltar. Some of the names of its different parts still speak of the history of the peoples on its shores. The *Ionian Sea* points back to the time when the islands on the south-west of the Balkan Peninsula were settled by Ionian Greeks; while the *Tyrrhenian Sea* still preserves the Greek name of Etruria. The term *Adriatic* even indicates something of the physical history which the sea has passed through within the memory of man, for it is derived from the town of Adria or Hadria, which, when the name was given, stood upon its shores, but now lies several miles inland.

But the more remote physical history of this basin is a matter of still greater interest, and worthy of a careful examination.

Let any one consider Europe and Asia as a whole, and he will find that the Black Sea, the Sea of Marmora, and the Mediterranean, lie in a western continuation of the great area of inland drainage of Central Asia, which, from

the confines of Europe on the west shore of the Caspian Sea, extends eastwards for a distance of about 3000 miles. In this immense area the Caspian, the Sea of Aral, Lake Balkhash, and all the numerous minor lakes, are salt, with the exception of those from whence minor rivers flow into lower lakes, in which case the upper lakes having outlets are fresh, and those into which they discharge themselves are salt, the latter having no outflowing streams by which to get rid of their surplus waters. Lake Baikal, which is fresh, is quite outside of this area. The reason of the saline quality of these lakes is obvious; for all rivers hold salts in solution, generally insensible to the taste, but appreciable to the analyses of the chemist; and, as lakes which do not discharge their water by outflowing rivers can get rid of it only by means of solar evaporation, the result is that the salts by degrees get more or less concentrated, reaching in rare cases almost to the point of complete saturation.

The surface of the Caspian Sea is 83·6 feet below the level of the Black Sea. In the north it is extremely shallow, but towards the south it deepens, and its extreme depth is about 500 fathoms, or 3000 feet.

The shallow and brackish Sea of Azof flows through the Strait of Kertch into the Black Sea, the efflux of its waters being constantly repaired by the influx of the river Don. The Black Sea flows through the river-like Bosporus into the Sea of Marmora, and the average loss of water which passes by this channel into the Mediterranean is more or less maintained by the influx of the Danube, the Dniester, and the Dnieper, which, in conjunction with the inflow from the Sea of Azof, have so far freshened the water of the Black Sea that its molluscan fauna, of Mediterranean type, is in some cases strangely distorted in form. The Black Sea is at least 6000 feet deep where deepest; while the Sea of Marmora,

which discharges its waters into the Mediterranean through the Dardanelles, is 3360 feet in depth.

Southward and westward of the Black Sea lies the Mediterranean, the largest sheet of inland water in the world. Its length is about 2300 miles, and when critically examined it resolves itself into three distinct basins, each of great depth. The eastern basin lies between the coasts of Syria and Sicily, and is about 1200 miles long, nearly the whole being more than 5000 feet deep, while its profoundest depths range from 9600 to 10,980 feet between Africa and Asia Minor, and reach their maximum of 13,020 feet half-way across between the Gulf of Sidra and the mouth of the Adriatic.

The middle basin lies south of Sicily, and is about 200 miles in length, the whole being over 2000 feet deep, while its greatest depth between Malta and Pantellaria, as given by Admiral Spratt, is 4200 feet.

The western Mediterranean basin, where more than 5000 feet in depth, is about 980 miles in length. Where deepest, near the African coast, opposite the mouth of the River Kebir, the depth is 9162 feet; between Marseilles and Minorca 9258 feet; and between Majorca and Algiers 9342 feet.

Taking a sinuous line of soundings at the mouth of the Mediterranean between Cape Plata in Spain and Cape Spartel in Africa, the average depth is from 600 to 780 feet for at least three-quarters of the way, while the greatest depth is 996 feet.

In studying the history of this comparatively shallow outlet of the Mediterranean, we find that there is geological evidence tending to show that it has been subject to various oscillations. At a recent period in the earth's history—probably during one of those interglacial episodes when a mild climate intervened between periods of Arctic severity—the outlet was closed. An isthmus of

land then connected Europe and Africa at this point, allowing of the passage into Europe of various African mammals (the *Rhinoceros leptorhinus*, African lynx, spotted hyæna, etc.), whose remains have been found in fissures and caves in the limestone rock of which Gibraltar is mainly composed Subsequently this isthmus was again submerged, and with it the rock of Gibraltar, to the depth of at least 700 feet, and then again there followed a re-elevation, which probably at one time reached such a height as to permit of a second immigration into Europe of African mammals.

The question thus arises, What effects have these oscillations of the relative levels of land and sea produced on the history of the Mediterranean?

If we consider the relation of the three Mediterranean basins and their soundings to the closing of that sea by upheaval of the above-named opening, it becomes obvious that, had the upheaval been sufficient also to uplift the comparatively shallow area between Sicily and Tunis, that which is now one long inland sea must then have presented the spectacle of three large salt lakes, comparable in their nature to the Caspian, the Black Sea, and the Sea of Marmora, the whole being then, even more obviously than now, a mere western prolongation of the area of inland drainage of Central Asia.

The eastern lake between the coasts of Syria and Sicily must have covered an area much more than twice as large as the present Caspian Sea, and south of the present coast of Sicily lay the second lake-basin, which, as shown by Admiral Spratt, somewhat resembled, both in form and size, the Sea of Marmora. Like that sea or salt lake, it also communicated with the more eastern lake by a narrow gorge 1740 feet deep where shallowest, and comparable to the Bosporus, through which the water of the Black Sea now flows as a rapid salt river to the

Sea of Marmora; while at its north-western end it communicated by a long narrow channel with the western basin that lies between Italy and the Strait of Gibraltar. This channel, which is now 1270 feet deep where shallowest, is aptly compared by Admiral Spratt to the salt stream of the Dardanelles, for they are much the same in length and breadth, and in each case the soundings rapidly deepen outside their two ends.

It thus appears that at a certain period of its history the Mediterranean area of depression was occupied by three great salt lakes, which communicated with each other by narrow river-like channels; and present soundings seem to indicate that a similar narrow and not very deep gorge for a time connected the western lake with the Atlantic Ocean.

Under these circumstances it is hard to determine whether the waters of the Mediterranean area were then salter or fresher than they are now. That they were not fresh we may be certain; but, if a river current ran from the Mediterranean into the Atlantic, it may be that, like the Black Sea now, these inland Mediterranean lakes were gradually freshening, unless solar evaporation of the broad land-locked waters helped to keep them salt, or even to make them salter than the Atlantic Ocean, which, indeed, the Mediterranean is now, in spite of the influx of such great rivers as the Don, the Dnieper, the Bug, the Dniester, the Danube, the Nile, the Po, the Rhone, and the Ebro, aided by all the other minor rivers that, from the west of Italy and from France and Spain, pour their waters into the great inland sea. If an amount of water equal to that of all these rivers now flowed through the Strait of Gibraltar into the Atlantic, the Mediterranean would of necessity gradually become freshened; but their freshening effect is more than counterbalanced by the mighty river-like rush of Atlantic water

which pours through the Straits, the influx of which is due to the immense amount of evaporation that is constantly going on from the surface of the great continental sea. One result of this is, that the present Mediterranean is somewhat more salt than the Atlantic, for the latter, according to Bischoff, contains 2·673 parts of common salt by weight in 100 parts of water, while, according to William Ramsay, the Mediterranean contains 2·946 parts, and *the proportion of pure water in the Atlantic* to all the substances held in solution is greater by ·243 than in the Mediterranean.

This difference is accompanied by a difference in specific gravity which leads to the superficial inflowing current being partially counterbalanced by a deep-sea outflowing current across the submarine ridge that shuts off the Mediterranean from the Atlantic. It is no doubt in consequence of this counter-current that a higher specific gravity is found at a depth of 350 fathoms than at the surface west of the ridge (1·0285 as against 1·0270); but there is more direct evidence of the existence of such a current in the fact that in 1712 a ship that foundered between Tangier and Tarifa was cast ashore a few days later about 5 leagues farther to the west. At the eastern end of the basin these conditions are reversed. From the Black Sea, where the influx of fresh water is in excess, there is an outflowing surface-current through the Bosporus, but, as shown by the explorations of the *Shearwater* in October 1872, a strong inflowing deep-sea current.[1]

Another result of the same steady inflow from the Atlantic is that the Mediterranean does not share in the Atlantic tides. The great inland sea is not, however, absolutely tideless, as has often been asserted. It has tides of its own, though small ones. At few places on

[1] O. Peschel's *Physische Erdkunde*, ii. 104-5.

its shores does the height of the tide exceed 2 feet, though near Venice it sometimes reaches 3 feet. At the Island of Zante it is no more than 6 inches.[1]

Such is a brief account of the past history and present state of the Mediterranean area; but something remains to be said respecting the physical origin of the inland basin in which its waters lie.

When we examine a geological map of Europe and the north coast of Africa, we observe that the Mediterranean area on the north side of the sea consists to a great extent of Miocene or Middle Tertiary and Pliocene or Upper Tertiary strata, and the same is the case with the land around the Sea of Marmora and the Black Sea, the Crimea, the shores of the Sea of Azof, and part of the west coast of the Caspian. Where Pliocene beds form the coasts they often merely conceal Miocene strata that underlie them. In like manner the Balearic Isles, Corsica and Sardinia, Gozo and Malta, also contain Miocene strata; Malta and Gozo being entirely formed of these, while Cyprus, Candia, and parts of Greece are partly formed of the same kind of rocks. In like manner the north of Africa at and near the sea between Tunis and Tangier, largely consists of Miocene formations, which form part of the mountain district south of Oran and Algiers, and extend to the flanks of the farther Atlas.

Considering that on the mainland of the Mediterranean region the Miocene strata are fragmentary, and that the same is also the case in the islands (this fragmentary condition being the result of time and widespread denudation), it is not too much to assume that a very great part of that area was once occupied by Miocene rocks, which, before the Mediterranean came into individual existence, formed a long and broad flat-lying

[1] K. E. A. von Hoff, *Geschichte der natürlichen Veränderungen der Erdoberfläche*, Gotha, 1834, vol. iii. p. 256 (cited by Peschel).

land, of which Malta and parts of the other Mediterranean islands survive as fragments. By and by a gradual sinking of this vast area began, apparently simultaneously with that of the subsidence of the Asiatic area of inland drainage (first explained by Pallas), of which, as already stated, the Mediterranean area is a western prolongation.

It is now a widely-accepted canon in geology that when on a great scale parts of the surface of the earth are depressed, other portions are upheaved, often more or less parallel to the areas of depression; and these effects being due to shrinkage of the earth's crust, mountain chains have been upheaved at various periods throughout all known geological time. It is for this reason that the strata of all great mountain chains are extremely contorted, the beds, once horizontal, having been, by intense lateral pressure, forced into a smaller space than they originally occupied when flat, just as plaited layers of cloth occupy less space than the same layers when flattened out.

It is a fact well known to geologists, that after the close of the Eocene or Lower Tertiary Epoch, the Pyrenees, the Alps, and the Carpathian Mountains, underwent one of those last and greatest upheavals, which raised them into chains of the first European magnitude. The Miocene epoch of the European area was a period of repose, except for the occurrence here and there of ordinary volcanic phenomena, accompanied by minor oscillations of the level of the land in relation to the sea. But in the area under review this epoch was brought to an end by a renewed upheaval of the Alps, the Pyrenees, the Caucasus, and other mountain regions already named. So important was this event, that the thick flat-lying consolidated Miocene rocks which flanked the bases of the older Alps on both sides were, together with these mountains, heaved

in places thousands of feet above their former level. Even at the present day they are found on the Rigi, for example, at the height of nearly 6000 feet above sea-level; but when we remember how much they must have since lost by degradation, we must conclude that the Alps and the other mountain ranges mentioned, must, at the beginning of post-Miocene times, have been prodigiously higher than they now are; and the amount of depression that the Mediterranean area underwent must have been commensurate, so to speak, with the great height to which the Alps, the Pyrenees, and other mountain ranges were upheaved in post-Miocene times.

The same kind of minor Miocene mountains adhere to the flanks of the Pyrenees and the Caucasus, and also to the other mountain regions already named, including the Atlas south of the Mediterranean; and indeed these remarks are equally applicable to the Himalayan range, which, after a prodigious upheaval in post-Eocene times, underwent, like the Alps, a second and post-Miocene elevation of great amount, as witnessed by the Siwalik hills on the southern flanks of the chain.

These facts easily lead us to the consideration of the gradual sinking of the great Asiatic area of inland drainage, which was the cause, or rather the complement, of the last great upheaval of the Himalayan range. A consequence of this depression of the land was, that an old Asiatic Mediterranean was formed in a basin, the relics of which still remain in the vast area of inland drainage, the proximate limits of which, from the Black and Caspian Seas eastward, have been insisted on by Sir Roderick Murchison, in his work on *Russia and the Ural Mountains.* In like manner, and if possible even more obviously in the opinion of some authorities, the gradual sinking of the Mediterranean area by degrees produced, first, the three great and deep inland salt lakes

already described, and afterwards, by further depression of the area, a vast inland sea, which, in time, by the submersion of the Strait of Gibraltar, admitted the inward rush of the waters of the Atlantic Ocean.

Finally, it may be pointed out that the deep-sea fauna of the Mediterranean has apparently been influenced by the physical history and by some of the present physical conditions just described. That fauna is surprisingly scanty, though recent explorations have shown that it is not quite so scanty as was at one time believed to be the case: they have proved also that the deep-sea forms of the Mediterranean are the same as, or allied to, those of the abyssal regions of the open ocean. Among other forms, the crab *Willemœsiâ* and the silicious sponge *Hyalonema*, both characteristic of the depths of the ocean, have now been dredged up from the bottom of the Mediterranean.[1] The poverty of the Mediterranean deep-sea fauna generally has been accounted for by supposing that it is due to the want of free oxygen in the depths of that sea. In the open ocean it has been shown that the surface polar waters, after getting oxygenated through their contact with the atmosphere, gradually sink in lower latitudes to the bottom, and then creep along the bottom towards the equator. But the situation of the Mediterranean is such as to exclude these abyssal waters. The submarine ridge at its mouth would probably in itself be sufficient to exclude them, but they are all the more effectually kept out by the effluent current that passes over the top of that ridge. The access of such abyssal oceanic forms as are found within it may possibly date from the periods when the bed of the Mediterranean was greatly depressed below its present level.

[1] See *La Scoperta di una Fauna abissale nel Mediterraneo*, by Professor Enrico H. Giglioli: Rome, 1881.

3. *The Western Coast—The North Sea.*

An arm of the Atlantic, forming the *English Channel* (*La Manche*, or "the sleeve," as the French call it, from its shape), divides the northern coast of France from the great group of the British Isles. These, however, once formed a part of the European mainland, from which they have been separated within a comparatively modern geological era. As shown on the river-basins map, they lie in very shallow waters covering a submarine plain which stretches on the one hand to the west of Ireland, and thence southwards through the Bay of Biscay to the neighbourhood of the Iberian coast, and, on the other hand, far across the North Sea. An inspection of that map will show that an elevation to so moderate an extent as 100 fathoms would be sufficient to obliterate the English Channel, St. George's Channel, and the whole of the North Sea, save a narrow strip of deep water running round the south-western extremity of Norway, as well as to extend the French coast a considerable distance to the west.

Were it possible to drain the *North Sea* or *German Ocean*, its bottom would present the appearance of a steppe with gentle undulating hills no larger than moderate-sized dunes. It was only subsequent to the glacial period, to which a more detailed reference will be made in a future paragraph, that the North Sea, by denudation and subsidence of an old plain, rolled in, and thus severed Great Britain from the mainland. Even in historic times the North Sea has been at work modifying the outlines of the coast, and the work is still going on. The east coast of England annually suffers considerable waste by the action of the weather and the sea, and on the mainland of Europe the Dollart was formed in Friesland on January 12, 1277; and the thirteenth century likewise witnessed the irruption of the Zuider Zee.

On the other hand, it is not to be forgotten that a process of an opposite kind is likewise going on, though at a much slower rate. The whole area of the North Sea is being gradually filled up by the deposition of sediment. It has been pointed out that even the colour of the water shows that there is much more matter of a sedimentary nature always to be found in the waters of the North Sea than in those of the Atlantic: this is due not only to the fact that the former is by much the shallower, but also to this, that there is no escape in the latter for the tidal wave. The tides from the Atlantic enter the North Sea both by the Strait of Dover on the south, and by the wider opening on the north. Towards the southern end of the sea the two branches of the wave meet, the high tide of the northern branch filling up the depression of the low tide of the southern, and *vice versâ*, so that at this part of the sea scarcely any tide is observable. Both tides are checked, and the arrest of the water promotes deposition. The Dogger Bank is a result of this process, and the shifting sands farther to the south are likewise due in part to the same cause, though the original formation of the Goodwin Sands is said to have been due to the submergence of an island within historical times.

4. *The Baltic.*

The North, or, as the Danes call it, the West Sea, repeats on a small scale the part played in the south of Europe by the Atlantic Ocean, inasmuch as it communicates, like it, towards the east with a true though less important inland sea. This inland sea is the *Baltic*,[1] the

[1] The origin of this word is doubtful. It is generally supposed to be derived from *Baltia*, the ancient name of an island off the coast of Scythia, perhaps Zealand. With the term Baltic the name of the *Belts* is probably connected. *Balta* in Lithuanian signifies "white," whence it has been suggested that the Baltic signifies the White Sea.

dimensions of which will be found in the statistical appendix.

The Baltic is essentially a shallow sea. During the expedition of the *Pomerania* in 1871 the greatest depth found was 126 fathoms, a depth which was reached between the Island of Gotland and Vindau, on the coast of Kourland. Near the mouths of rivers which empty themselves into the Baltic the depth of water becomes greatly diminished by the accumulation of detritus, and many of the harbours are in constant danger of being silted up.

As regards its physical conditions, the Baltic presents in many points a contrast to the Mediterranean, the corresponding inland sea in the south. We have just seen that it is a shallow, while the Mediterranean is a deep sea. But, moreover, it will be remembered that in the Mediterranean evaporation preponderates over rainfall and river-discharge, and the water is consequently abnormally salt. Here, however, the reverse is the case. In consequence of the vast volumes of fresh water which are continually being poured into the Baltic, and the comparatively small amount of evaporation, the salinity is exceedingly low. As might be expected, the farther we penetrate into the Baltic the fresher is the water. Thus in the northern part of the Gulf of Bothnia the surface-water is almost sweet, while as we return southwards it becomes more and more brackish, though even in the Belts the surface-water is not more than half as salt as the water of the North Sea. Further, just as in the Mediterranean, the preponderance of evaporation leads to an inflowing current from the Atlantic, so here the preponderance of influx gives rise to an outflowing surface-current through the Belts into the Kattegat. Sometimes, it is true, the wind neutralises or even reverses this current; but under normal conditions it sets from the

Baltic outwards. Beneath this outflowing current of light and comparatively fresh water there may, however, be detected a current of denser and salter water which sets towards the Baltic, just as there is an outflowing current in deep water at the Atlantic mouth of the Mediterranean. This deep backflow naturally retards the freshening of the waters.

But there is one point in which the two seas correspond. As in the Mediterranean, so in the Baltic, tidal influence is felt to only a very small extent. At Copenhagen the difference of the tides is about 1 foot, while in the harbour of Wismar it does not exceed 3 or 4 inches; and as we advance far into the inland sea it becomes almost inappreciable. It is notable, however, that the Baltic waters are subject to changes of level corresponding to barometric variations, and similar to the *seiches* of the Swiss lakes.

As a consequence partly of the comparatively fresh character of the water, and partly of the shallowness of the sea, the surface of the Baltic is very readily frozen, and all its ports are ice-bound for at least a third of the year. During frosts of exceptional severity the entire surface of the Baltic has been frozen over. Thus in 1658 Charles X. of Sweden, returning from Poland to attack Frederick III. of Denmark, marched his army across the Belts; and in 1809 a Russian force passed from Finland to Sweden across the frozen waters of the Gulf of Bothnia.

5. *The Northern Islands and Seas.*

Though in no way geographically connected with Europe, still there are generally included in this division of the globe certain islands which are situated in the North Atlantic and Arctic Oceans. Rising from a submarine plateau in the Mid-Atlantic, between Norway and

Iceland, and distant some 200 miles from the northernmost point of Scotland, are the *Faroe Islands* (in Danish *Färöer*, that is, "sheep islands"), a group of twenty-five islands and islets, composed mainly of basaltic and other volcanic rocks, believed to be of Miocene age, and associated in two of the islands with beds of lignite or impure coal.

A submarine ridge connects the Faroe Isles with the great volcanic island of *Iceland*, the last refuge of Norse legends, speech, and customs. This interesting island will be described when treating of Scandinavia. Against North Cape, the northernmost extremity of Europe, and along the shores of this arctic section of the continent, surges the *Polar Sea* or *Arctic Ocean*, which forms southwards a vast bight known as the *White Sea*, nowhere more than 500 feet deep. The Polar Sea also washes the shores of several islands, including some of considerable extent, such as *Kaniskaia Zemlya* and *Kolgouef*, two islands off the coast of Russia, between the mouth of the Petchora and the White Sea; while the group of *Novaya Zemlya* stretches northward as far as latitude 75°. This group may be described as a northern continuation of the Ural chain, an intermediate step being represented by the island of *Waigatch*, which is separated from the Russian mainland only by the narrrow channel called Yougar Strait.

North of Novaya Zemlya lies the archipelago of *Franz-Joseph Land*, discovered by Payer and Weyprecht in 1874. This group of islands includes the most northern land yet discovered in European seas, one part of the group, known as Petermann Land, extending beyond 83° N. latitude. Due north of Scandinavia, and therefore to the west of Franz-Joseph Land, is the archipelago of *Spitzbergen*, discovered by Barents as early as 1596. The other islands of the Polar Sea, which are usually regarded as northern satellites of the European continent, are of very slender

interest. To the east of Spitzbergen are *Wiche's Land* and *Giles' Land;* between Spitzbergen and the Scandinavian mainland is *Bear Island;* and between Bear Island and Iceland there rises in mid-ocean the volcanic island of *Jan Mayen.*

6. *Relief of Europe.*

For a general idea of the relief of Europe the reader is referred to the physical map, and descriptive details will be found in the following chapters dealing with the divisions of the continent: hence in this place a brief notice will suffice. A glance at the map will reveal the fact that the orographical features of Europe are no less diversified than are the outlines of its coasts.

It will be observed, also, that, with the exception of the dividing range between Europe and Asia in the north-east, the mountains are confined to the north-west and the south, and that in the south the prevailing direction of the chains is ffom east to west, just as in the corresponding latitudes of Asia. This latter circumstance, as we shall afterwards find, has an important effect on the climate and the distribution of animal and vegetable life on the continent.

The highest and most important ranges of mountains in Europe, within the limits adopted for the continent in this volume, belong to the *Alps,* and of these it will be well to give here a short general account, inasmuch as this cannot appropriately be done in any of the subsequent chapters, none of which embraces the whole region traversed by them. These mountains cover a total area of about 90,000 square miles in the very heart of the continent, and just about midway between the Equator and the North Pole. They begin with the Maritime Alps, the lowest range in the group, between France and Italy, and sweep round first northwards and then eastwards through

Switzerland into Tyrol and the adjoining provinces of Austria, where the last spurs spread out like the leaves of a fan. They consist of many successive and parallel chains. Where broadest they extend over a stretch of about 170 miles. Their highest summits are in the middle ranges, those bounding the east and west part of the Rhone valley, where there are many peaks exceeding 13,000 feet in height. Their culminating point, as is known to everybody, is Mont Blanc in Savoy, which attains an elevation of 15,732 feet. A general character of the group is the extremely zigzag outline of the ridges owing to the great height to which the peaks rise above the average elevation of the chains. While many summits attain the altitude just indicated, it is a noteworthy fact that most of the passes are under 7000 feet in height.[1] In this respect the Alps present a contrast to the Pyrenees, in which most of the passes are only slight notches in a remarkably regular ridge.

The *mean* height of Europe was estimated by Humboldt to be 669 feet (204 mètres). But according to the more recent calculations of Dr. Gustav Leipoldt,[2] based on data not at Humboldt's command, the mean elevation of the European continent is not less than 973·8 feet (296·8 mètres).[3]

[1] It is a curious fact that the heights of the principal passes of the Alps leading into Italy are in most cases nearly the same. They are:

	Feet.		Feet.
Great St. Bernard . .	8120	St. Gothard . .	6936
Little St. Bernard . .	7200	Mont Cenis . .	6848
Splügen . . .	6945	Simplon . . .	6595

[2] *Ueber die mittlere Höhe Europa's*, 1874.

[3] It may be interesting to give the following comparison of the mean heights of the several continents, expressed in round numbers:

	English Feet.		Mètres.
Europe	980	=	300
Asia	1650	=	500
Africa	1970	=	600
America	1350	=	410
Australia	820	=	250

ATLANTIC OCEAN
BRITISH ISLES
EUROPE
MEDITERRANEAN SEA
AFRICA
HYDROGRAPHICAL MAP OF
EUROPE

7. *River Systems.*

Regarding the rivers of Europe, it is first of all worthy of note that their course is for the most part determined in conformity to the general disposition of the mountain systems. The rivers, as a rule, do not cut through the mountains, but flow on different sides of them towards different seas. The Alps and the Carpathians send forth great streams to the north and south, and the Danube, the greatest of the European rivers in respect of volume, the second in point of length, flows between these two mountain systems. The Pyrenees form the water-parting between France and Spain, the Urals between Europe and Asia, and the Apennines and the highlands of Scandinavia form those of their respective peninsulas. This arrangement of the rivers of Europe in obedience to the prevailing orographical features might be taken almost as a matter of course, yet it is a characteristic in which this continent contrasts more or less with all the others. In Asia the lofty ranges enclosing the great central and western table-lands are everywhere pierced by the great continental rivers,[1] and the same is the case with the rivers of the Rocky Mountain region in North America;[2] while in the eastern part of the latter continent the principal streams, —the Potomac, the Susquehanna, and the Delaware,—in their passage to the Atlantic, cut right across the highest ranges of the Alleghanies. Africa is described by Livingstone as an elevated plateau somewhat depressed in the centre, with fissures for the escape of the rivers;[3] and subsequent explorations have confirmed this description. Europe itself is not without minor exceptions to the rule just stated. The Elbe has to pierce the Erzgebirge before

[1] See vol. "Asia" in Stanford's *Compendium*, p. 10.
[2] See vol. "North America," p. 43.
[3] *The Zambezi and its Tributaries*, p. 5.

it reaches the North German plain. The Danube may justly be said to divide the Carpathians at the Iron Gate (see BALKAN PENINSULA), and the Transylvanian Carpathians are also intersected by one or two of the great tributaries of that river, such as the Aluta. In our own island the rivers which drain the Weald of Sussex and Kent, flowing northwards and southwards, cut through the chalk escarpments of the North and South Downs. Other minor exceptions to the rule will be noted in the subsequent chapters, but Europe presents no exceptions on a scale corresponding to what is observed in Asia, America, and Africa; and the Elbe is indeed the only European river of importance which traverses in its course a range of mountains of greater elevation than the water-parting of the district where it takes its rise.

The facilities afforded to navigation by the rivers of Europe are of the highest importance, but they are of a different kind from those presented by the great rivers of Asia and America. The configuration of the European continent does not allow of the development of rivers which can rival in magnitude and volume those of the land-masses just mentioned; and in the case of its longest rivers, the Volga and the Danube, there are special circumstances that deprive them of the value that they might otherwise have possessed as water-ways. The Volga, with its numerous important tributaries, has a very considerable length of inland navigation (see RUSSIA), but, unfortunately for Russia, empties itself into an inland sea, so that all the water-ways belonging to its system are cut off from direct communication with the outside world; while the Danube, which itself begins to be navigable at Ulm in Bavaria, and is joined in its course by sixty navigable streams, has its lower course obstructed by a rocky barrier, difficult and dangerous to cross (see AUSTRIA, Hydrography). The chief importance

of the rivers of Europe in respect of their navigability is derived from the fact that the varied outline and configuration of the continent cause so many streams to reach the coast directly, thus giving access from many points at a longer or shorter distance inland.

For purposes of irrigation the rivers of southern Europe are also of the highest importance. South of the parallel of 40° N. the perennial streams become fewer and fewer, giving place to those which dry up in summer, and in some parts streams that might otherwise flow perennially are prevented from reaching the sea in summer through having their water drawn off to feed irrigation canals. Such, for example, is frequently the case in the south-east of Spain, where the irrigation works of the Arabs are still in a large measure maintained. But the most fully-developed system of irrigation in Europe is to be found north of the limit mentioned in the valley of the Po, where the abundant waters brought down from the Alps by the tributaries of that river are utilised with the utmost skill.

8. *Lakes and Fiords of Europe.*

Another striking feature of the hydrography of Europe is the large number of lakes dotted over its surface. The central Alps are fringed both on the north and south by series of lakes, those on the north having their surfaces at an elevation of from 1200 to 2000 feet above sea-level, while those on the south lie at a height of from 600 to 700 feet. In like manner in Scandinavia there is a still greater profusion of lakes, most of which lie in Sweden on the east side of the water-parting; while all along the north and west coasts of Norway the mountains are penetrated by a vast number of fiords, long, steep-sided, and deep in their upper reaches, but comparatively

shallow at their mouths. This combination of fiord and lake scenery is in like manner well shown on the west coast and in the interior of the Highlands of Scotland, but on a smaller scale, proportionate to the more limited area of the country and the lesser height of its mountains. In England there are no true fiords, but many lakes in the mountain regions of Cumberland and North Wales.

The region between the White Sea and the Gulf of Finland is also, so to say, strewn broad-cast with lakes.

It is certain that in Europe and in North America the prevalence of lakes in the interior and of fiords on the coast is especially characteristic of high mountain regions, and indeed of all those territories that are, or have been, much affected by glacier-ice on a large scale.

It is a fact familiar to geologists that on the southern side of the Alps vast sheets of glacier-ice passed down the valleys, and deposited their terminal moraines sometimes far out in the valley of the Po. The same was the case on the northern side of the Alps, but on a still larger scale, for a vast glacier-sheet spread across the whole of the so-called Lowlands of Switzerland, so thick that it passed at least half-way across the range of the Jura, and far eastward to the neighbourhood of Linz, on the Danube; while to the west broad and thick branches of glacier-ice passed from Mont Blanc towards the valley of the Rhone; and all down the Upper Rhone valley by Geneva a glacier pushed on to where Lyons now stands, and there deposited a great terminal moraine. It has been shown by M. Alphonse Favre that the thickness of the Rhone glacier above the delta of the river where it enters the Lake of Geneva was in places more than 5000 feet, and perhaps even this is an under-estimate.

The country between the higher Alps and the Jura is formed of Miocene strata, which to a great extent consist of sandstones and soft marls, while the Alps proper

are formed of older and harder rocks. The post-Miocene upheaval of the Alps being of much older date than the great Glacial Epoch, there is every reason to suppose that, by the influence of rain and rivers, the greater valleys of the mountains had been to a very great extent scooped out before the beginning of the gradual growth and increase of the Alpine glaciers. Therefore, when, by increasing severity of the climate, the glaciers grew in size and weight of ice, it is obvious that their erosive power must have been generally greatest in the deeper valleys through which they flowed, and also in the country formed of Miocene rocks opposite these valleys across which the glaciers steadily progressed. The obvious result follows, that in and beyond these valleys the eroding power of ice, thousands of feet in thickness, was greatest, and the effect for a space was to scoop out broad and deep grooves or hollows, shallow at their upper ends, often deepest more or less towards the middle, and shallow towards their lower ends, where the ice began to thin, or where harder rocks that crossed the onward march of the heavy ice-stream proved more difficult of erosion. When, in course of time, the climate began to ameliorate, the glaciers by degrees retired into the interior valleys of the higher Alps, where, very much shrunken in size, many of them still remain. The result was, the first appearance on the south side of the Alps of such great lakes as Maggiore, Lugano, Como, and Garda, bounded by mountains on the north, west, and east, and by moraines and low rock-barriers on the south. The same conformation has been proved with regard to the large lakes of Switzerland that lie between the Alps and the Jura. For example, the Lake of Geneva, near its middle, is about 1000 feet deep; while towards Geneva it gradually shallows, and not far below the outflow of the Rhone solid rocks form

the bed of the river only a few feet below the level of the surface of the lake. The same kind of reasoning shows that the lakes of Brienz and Thun are rock-bound. These originally formed one lake till separated by the growth of the delta that now forms broad alluvial meadows. It has also been shown that the lakes of Lucerne (1437 feet above the sea), Zug, the Wallen-see, Zürich, Constance, and Neuchâtel, all lie in rock-basins produced by the erosive power of glacier-ice; and high up among the Alps there are many minor lakes visibly bordered all round by glaciated rocks, such as the lake by the hotel at the Grimsel, the Todten-see higher up by the route to the valley of the Rhone, and the lakes of Sarnen and Lungern on the road across the Brünig between Lucerne and Meyringen.[1]

In like manner all, or almost all, the lakes of Sweden and Norway were scooped out by those great ancient glaciers that ploughed their way from the Scandinavian chain towards the Gulf of Bothnia and the Baltic, and the minor lakes of Norway farther north had the same origin. Furthermore, the great array of fiords that intersect the whole coast of Norway owe their peculiar configuration to the erosive power of glacier-ice, for each fiord is simply a deep valley prolonged from the mainland under the sea, and all of these valleys were once filled with glaciers sometimes thousands of feet in thickness. Also, when critically examined with the sounding-line, it is shown that such fiords are always shallow at their mouths, with deep interior basins towards their upper ends. Were the whole country and the adjoining sea-bottom heaved up sufficiently high, every or almost every fiord would present the spectacle of a steep-sided valley containing a deep lake, comparable to the valley

[1] For details on this and allied subjects see "On the Glacial Origin of certain Lakes," etc., *Quart. Jour. Geol. Soc.*, 1862, vol. xviii.

of Loch Lomond in Scotland or to the lakes of Maggiore and Como, which in part of their history may be aptly compared to Norwegian fiords.[1]

The lakes of Finland, according to Professor Nordenskjöld, are not rock-bound basins, but of a kind common in the lowlands of many regions that have been subjected to glacial action. Whatever the precise cause may have been, the effect was to produce great tracts of irregular mounds of sand and gravel called *åsar* (plural of *ås*), so arranged that they are apt to enclose many hollows, great and small, in which the inland waters accumulate—sometimes, as in Finland, forming numerous lakes.

However this may be, it is certain that some of these lakes are more than a hundred miles long, and are surrounded by land over 500 feet in height, and in their general outlines bear a strong resemblance to some of the rock-bound lakes of Sweden and Norway. Like that country, it is also certain that the whole of Finland was overwhelmed by the great Scandinavian ice-sheet, which, indeed, advanced at least *three times* over northern Germany as far as Altenburg and Dresden, as shown by Dr. Penck of Munich.

Turning to the mountainous districts of Great Britain, the phenomena common in Sweden and Norway are repeated there. As in Scandinavia, so in the Highlands of Scotland, there are unnumbered lakes, great and small, and the same is the case amidst the mountains of Cumberland and Westmoreland, of Wales, and of Ireland. In

[1] All of these circumstances regarding the lakes and fiords of Scandinavia were inferred and published by Professor Ramsay in 1862, and his inferences were afterwards strongly supported by Professor Amund Helland of Christiania in his admirable memoirs, "On the Ice-fiords of North Greenland, and on the Formation of Fiords, Lakes, and Cirques in Norway and Greenland," *Journal of the Geol. Soc.*, 1877.

all these regions, too, we meet, as is well known, with the most unequivocal marks of former glaciation, and, in short, we find everywhere in Europe proofs of an intimate connection between the Glacial Epoch and the presence of a great number of lakes, large and small, and of fiords on rocky mountain coasts in certain northern latitudes. It may be remarked, moreover, by way of confirmation, that the same rule holds good in North America, where both lakes and fiords cease about latitude 42°; while to the north (east of the Rocky Mountains) the whole country may be said to be sown broad-cast with lakes.

9. *Geological History.*

In a previous section part of the geological history of southern Europe has been given in connection with the physical history of the Mediterranean basin, and it will now be well to complete that sketch by taking a rapid survey of the growth of the European continent.[1]

So far as the researches of geologists can reach, the oldest extensive land-area representing the European continent appears to have lain in the north and north-west, and probably stretched far towards the margin of the submarine plateau previously described, though now surviving only in the Archæan rocks of Finland, Scandinavia, the north-west of Scotland, and a few other widely-separated localities. To the south lay a shallow sea spreading over most of the European area, but probably having islands in its midst. The bed of this sea slowly subsided, receiving as it sank the deposits that now form the Cambrian and Silurian rocks; and this went on until, in the region where Britain now lies, the

[1] For part of the following sketch we are indebted to a paper by Dr. Arch. Geikie on "Geographical Evolution," *Proc. Roy. Geograph. Soc.*, 1879, p. 422, republished in Geikie's *Geological Sketches*, 1882, p. 312.

ATLANTIC
OCEAN
BRITISH
ISLES
EUROPE
MEDITERRANEAN
SEA
AFRICA
HYDROGRAPHICAL MAP OF
EUROPE

accumulated sediment attained a thickness of several miles. At the close of this period vast changes took place, which led to the first appearance of elevated ridges on the sites of the Alps, the mountains of Spain, and the highlands of Britain. The floor of the Silurian sea underwent violent contraction, by which its strata were thrown into undulations and folds, and considerable areas were forced above the surface of the water. Large basins of water were thus cut off from the ocean, and became gradually converted into fresh-water lakes, the waters of which, however, were strongly impregnated with iron. These lakes are now represented by the deposits of the Old Red Sandstone epoch, in which the characteristic rock is a sandstone having each of its grains of sand coated with a thin pellicle of oxide of iron. From the position in which these deposits are found, and the nature of the remains contained in them, it would seem that one of these large lakes extended right across the centre of Scotland almost to the western sea-board of Ireland; while another, to which the name of *Orcadia* has been given by Prof. A. Geikie, extended from the west of the Moray Firth to the Sognefjord and Dalsfjord in Norway, and even perhaps into western Russia.

Meanwhile further changes were going on. While the most extensive area of high ground still lay on the north-west, the southern parts of Europe came to be represented only by a number of islands. What are now the high grounds of Britain were then merely an island group. The elevated land of Bavaria and Bohemia likewise stood out above the waters. The Spanish peninsula was an island of still larger size, and an irregular ridge stretched from the Mediterranean across the site of France towards what is now Brittany. As the shallow waters surrounding the islands and ridges became slowly silted up, great tracts of marsh were formed. Crypto-

gamic vegetation flourished in these marshes, and during a succession of slow depressions and upheavals much of this vegetation came to be buried under submarine mud. In this way the principal European coalfields, those of the Carboniferous era, took their birth.

Movements of upheaval, ushering in the next era, led to the formation of great land-locked basins similar to those which had characterised the Old Red Sandstone epoch, with this difference, however, that the basins of this later era were in many cases much more completely cut off from the sea than the earlier ones. Those having no outlets became salt, and many of the principal beds of rock-salt in Europe—such as those of Cheshire in England; those of Stassfurt, Halle, and Sperenberg in Germany; those of Hallein and Berchtesgaden in Bavaria; and of the Salzkammergut in Austria—are relics of these old Permian and Triassic lakes.

It may here be mentioned that it was previous to this era that the first and principal upheaval of the Ural Mountains took place. Silurian, Devonian, and Carboniferous rocks make up the bulk of these mountains on the flanks of their crystalline core; but the Permian at their base are composed of the waste derived by denudation from these older strata. And it is likewise worthy of notice that during all the various disturbances that took place in the course of the development of the European continent, the greater part of the Russian area escaped the violent contortions that affected most of the rest of Europe. Only in the Urals themselves and in the Crimea do we meet with those crumplings which are characteristic of chains of upheaval generally; it has, however, recently been shown by Prof. Karpinsky that some dislocation and disturbance are likewise apparent in a region in the south stretching from the Sandomir ridge in the south of Poland, through the governments of Kief and

Poltava, to the coal-basin of the Donetz, and thence to the Bogdo Hills in Astrakhan.[1]

After the Triassic period in the geological history of Europe, subsidence occurred to an extent far exceeding any that had yet taken place. It is true the highlands of the north-west of Britain still continued to remain as land; but it seems probable that most of the other parts of Europe that had been dry since the ridging up of the floor of the Silurian sea were now again submerged. The Northern Alps were once more laid under water, and so also was at last a large part of the Iberian plateau. In this wide-spreading sea were formed those thousands of feet of lime-stone, shale, and sandstone that constitute the Jurassic system.

A still greater amount of submergence distinguished the succeeding age, known as the Cretaceous. Yet the sea that covered so much of the European area at this period was probably a shallow sea, not exceeding a few hundred feet in depth. There appears to be reason to believe that there was a northern basin somewhat isolated from the open ocean of the southern region. In the northern basin was deposited the calcareous ooze which became converted into the white chalk of England, of the north of France, Belgium, Denmark, and North Germany; while contemporaneously there was formed in the open ocean of southern Europe the "hippurite lime-stone."

Again during the Eocene epoch the European area seems to have been represented less by land than by water. A wide sea, indeed, appears to have occupied the greater part of Central Europe and of Asia; and it was not till Eocene times were drawing to an end that the European continent began to assume somewhat of its present form.

[1] *Nature*, vol. xxix. p. 461, citing *Memoirs of the St. Petersburg Society of Naturalists*, vol. xiii.

It was then that the great mountain chains of the south —the Pyrenees, the Alps, the Apennines, and the Carpathians, as well as the Caucasus—were upheaved to a considerable elevation, the upheaval being accompanied with violent contortions of the strata. The subsequent history of the European continent consists chiefly in minor modifications of the outline, the filling up of great internal lakes, and the raising of the mountains to a still higher level by secondary upheavals, as already indicated in the section dealing with the physical history of the Mediterranean. During Miocene times the lofty range of the Alps was flanked on the north by a great fresh-water lake; and it is interesting to find that the remains disinterred from its ancient bed prove that Europe then supported a vegetation characteristic of a much warmer climate than it now enjoys. Date-palms, sequoias, Canary laurels, and evergreen oaks were then among its products; and it is still more remarkable that other vegetable remains of the same epoch show that an almost equally genial climate must have prevailed throughout the whole of the continent, even to the extreme north, and, indeed, far beyond the present northern confines of Europe.

It was after the close of the next period—the Pliocene —towards the end of which the climate of Europe was getting gradually colder, that the Glacial Epoch referred to in the previous section occurred. The mountains of Scandinavia, the British Isles as far south as the Thames valley, the whole of the North German plain, with the intervening seas, and all the north-west of Russia, were then covered with one vast sheet of ice in some places thousands of feet thick; and at the same time enormous glaciers descended from the Alps, while the other lofty ranges of Europe were all more or less glaciated. The effect of this state of things on the

surface of Europe was not confined to the area invaded by ice. Within that area it not only seems to have hollowed out lake-basins in the manner already indicated, but it likewise overspread the surface, especially in the hollows, with a covering of triturated earth known as boulder-clay — a deposit generally supposed to be derived from the underlying rocks by the grinding action of the moving mass of ice. But a large part of the richest soil of Europe beyond the limits of the glaciers and the great northern *mer de glace* seems to have owed its origin to the same conditions. In all the river-basins of central Europe, in the Rhone valley, the valley of the Rhine and its tributaries, those of the Fulda, Werra, and Weser, in the basin of the Elbe, the Hungarian flats watered by the Danube and its tributaries, and even in the higher valleys of the Carpathians, there is a deposit known as löss, "a yellow or pale grayish-brown, fine-grained, and more or less homogeneous, consistent, non-plastic loam, consisting of an intimate admixture of clay and carbonate of lime," found not only in the lower grounds, where it is thickest, but even at heights of 800 and 2000 feet, sometimes, it is even said, 3000 to 5000 feet.[1] Everywhere these deposits form an exceedingly fertile soil. Various theories have been advanced as to their origin; but almost all who have inquired into the subject appear to be agreed that the material of which they are composed is the fine silt derived from the grinding action of glaciers; and the most probable explanation of their distribution seems to be that this silt was spread over the surface of the land during the floods that must have overtaken the rivers at the annual melting of the snows and ice in the glacial summers, the higher deposits being thus laid down when the rivers flowed at higher levels, the lower ones at subsequent periods when the

[1] Prof. J. Geikie, *Prehistoric Europe*, pp. 144, 146.

rivers had worn their beds to greater depths. In the case of the rivers flowing northwards, the extent of the floods would naturally be increased by the fact that the rivers would be obstructed by the great ice-sheet that then overspread the land.[1]

Again, in Russia, where löss is absent, there is an enormous area in the south covered by a rich soil known as *chernozem*, or "black earth," and a similar explanation would account for its presence in that region; but, owing to the difference of the configuration of the surface, and owing to the fact that the floods from the foot of the ice-sheet drained southwards, where there was no obstruction to their course, the chernozem was more evenly distributed, and never attained such a thickness as is sometimes reached by the löss.[2]

10. *Climate.*

It is in studying the climate of Europe that it is most important to remember that this division of the earth is, after all, simply a peninsula of the great Eurasian continent. It is only by so doing that we can discern the correspondences and understand the differences between Europe and America. As part of the Eurasian continent Europe corresponds only to the western part of North America, and, like it, has its temperature greatly equalised by its proximity to the sea. In the north-west it is considerably elevated through the influence of warm marine currents from the south-west. Hence, if we trace the isotherm of 32° Fahr. for the coldest month in the year, we find that it descends almost straight from north to south through the south-west of Norway to the heart of the continent, showing unmistakably how the proximity

[1] Prof. J. Geikie, *Prehistoric Europe*, p. 239.
[2] *Ibid.*, p. 243.

RAINFALL AND TEMPERATURE MAP OF EUROPE

London, Edward Stanford, 55 Charing Cross, S.W.

of the sea tends to keep up the winter temperature. It must always be remembered, however, that the direct effect of the sea is upon the winds that blow over its surface. It is the winds that are the direct carriers of temperature from the ocean to the land, and it is owing to the fact that in the parts of Europe referred to, as in the similarly situated parts of America, the prevailing winds are south-westerly, that these regions are so exceptionally favoured in respect of temperature. In Europe, however, this favourable influence reaches to a higher latitude than in the western continent, inasmuch as the configuration of the North Atlantic Ocean has the effect of causing a greater body of warm water to be carried by currents to its shores. Applying the term temperate zone to the belt included between the annual isotherms of 32° and 68° Fahr. (0° and 20° C.), Dr. Alex. Supan, of the University of Czernowitz, has found that the whole of Europe, except the extreme north of Russia, is embraced by it; and dividing this zone into an equatorial, or southern, and a polar, or northern, section by the isothermal of 32° Fahr. for the coldest month of the year, though he thus assigns to the former a much larger proportion of Europe than of America, he has calculated that the proportion between these two sections in America and Eurasia is nearly the same.[1]

In consequence of the equalising influence of the North Atlantic Ocean, with its warm currents, upon the temperature, it follows that, as in America, so also in Europe, the extremes of temperature between summer and winter increase as we go eastwards. This is well illustrated by the following figures showing the mean temperature for the whole year, for the coldest and warmest months (January and July), and the difference between the last two, in a number of places situated

[1] See Petermann's *Mittheilungen* Sept. 1879.

within a degree of the same latitude ($51\frac{1}{2}$-$52\frac{1}{2}$), but in different longitudes :—

	Year.	Jan.	July.	Difference.
Greenwich . .	49·7° F.	38·9° F.	62·6° F.	23·5° F.
Berlin . . .	48·4	31·3	66·2	34·9
Warsaw (W. Russia)	44·9	24·1	65·5	41·4
Saratof (E. Russia) .	41·7	13·6	71·1	57·5

On this increasing range in the temperature as we go eastwards the Baltic has comparatively little counteracting influence, as is shown by the fact that at Arbroath, in Scotland, the mean range of temperature between the hottest and coldest months amounts to only $21\frac{1}{2}$° F., as against nearly 42° F. at Riga, which is situated in approximately the same latitude. In the south of Europe, on the other hand, the Mediterranean Sea, owing to its greater size, has a markedly equalising influence upon climate, in proof of which the same data as those given above for Greenwich, Berlin, Warsaw, and Saratof are here furnished for four towns, all lying in nearly the same latitude (about 38° N.) in southern Europe :—[1]

	Year.	Jan.	July.	Difference.
Lisbon . .	60·1° F.	50·5° F.	70·1° F.	19·6° F.
Murcia . .	62·6	48·7	78·9	30·2
Palermo . .	63·7	51·6	76·8	25·2
Athens . .	64·8	47·6	82·6	35·0

It will be observed that the mean temperature of the year and the temperature for July are lower at Lisbon than in all the towns mentioned on the Mediterranean, which shows that in southern Europe the influence of the Atlantic on temperature is a lowering one, unlike what is found in the north. The data furnished by other meteorological stations on the Atlantic seaboard of the Iberian peninsula confirm this observation, and the effect in

[1] Reduced from the C. to the F. scale from Fischer's *Klima der Mittelmeerländer*, p. 23.

question is to be explained, according to Fischer in the treatise just cited, as due to the existence of a cold current on the coast of Portugal.

But it is not merely to the Mediterranean Sea that the countries on its shores owe the remarkably uniform climate which they enjoy. Another climatic advantage is derived from the fact, already referred to in a previous section, that the mountains in the north of this region have a prevailing east and west direction, and, being almost continuous, act as a barrier to shut off the colder winds from the north. The benefit of this barrier is at once observable when we compare the temperature of places situated beyond its protection with that of those within it. Constantinople is nearly in the same latitude as Naples, but while the mean temperature for the year at the former city is under 57° Fahr., and for the month of January about 40° F., the corresponding temperatures in the latter are 62½° and 50°. The rivers of southern Russia are regularly frozen for a longer or shorter period every year, while on the southern slopes of the range of mountains that traverses the south-east of the Crimea the climate is greatly ameliorated, and the Mediterranean flora reappears as if by magic.

The rain-chart of Europe presents the main general facts regarding the rainfall so far as they can be shown by such a method, but it will be worth while to devote a few sentences to the consideration of the meaning of the facts there portrayed. In doing so it is necessary to bear in mind that the moisture that falls as rain is mostly derived by evaporation from the ocean; that in Europe such moisture is carried to the land mainly by south-westerly winds, the exact direction of which, however, is greatly affected by local features; that the chief cause of condensation, or, in other words, the conversion of invisible vapour into clouds and rain, is a reduction of tempera-

ture; and that hence, in the case of places at an equal distance from the source of moisture, the rainfall is sure to be greatest at the place where, and the time when, there is the greatest difference between the temperature above the land and that above the ocean whence the moisture is derived. These facts being kept in view, it will be readily understood why the rainfall, on the whole, diminishes from the west eastwards, and likewise why there are exceptions to this general rule. Everywhere mountains have the effect of condensing the moisture by forcing the vapour-charged air to ascend to higher and colder levels. The higher the mountains the more inevitably will this effect be produced, and when the mountains run at right angles to the direction of the prevailing rain-bearing wind, like the Harz, the Böhmerwald, and the Riesengebirge in Germany, they give rise to a heavy rainfall to the south-west, while the region to the north-east remains comparatively dry. Such being the effect of mountains, it is important to note that Europe enjoys a great advantage over the corresponding part of the New World—namely, the west of North America,—in that it has no continuous range of high mountains near the coast to shut off the fertilising moisture from any great tract in the interior. The high mountains of Europe are for the most part in the heart of the continent, and, even where they are not so, do not run at right angles to the direction of the rain-bearing winds. Hence, though the mountains and hills of Great Britain and Scandinavia cause the west coasts of those countries to be much wetter than the eastern sides, yet they are neither sufficiently high nor so placed as to deprive the latter altogether of their share of moisture.

The following figures[1] illustrate in an interesting

[1] Reduced from Otto Krümmel in *Zeitschrift der Erdkunde*, vol. xiii., 1878. (Fractions disregarded).

manner the difference between west and east coasts as regards rainfall, especially where mountains intervene :—

West.	Inches per year.	East.	Inches per year.
Galway	52	Dublin	30
Skye	103	Aberdeen	30
Penzance	42	London	25
Bergen	90	Christiania	22
Göteborg	33	Stockholm	16
Husum	30	Lübeck	23

As to the period when the rains occur, it will be observed, in the first place, that the map divides Europe into two great regions,—one in the north, in which the rains are pretty equally distributed over all seasons, and the other embracing the whole of the Mediterranean region, in which there is a decided preponderance of winter-rains, and characterised in the south by almost entirely rainless summers. This division of Europe, as regards rainfall, into two zones, the southern of which is called the sub-tropical zone (including not only the European, but also the Asiatic and African countries bordering on the Mediterranean), was originally based on the labours of the German meteorologist Dove, and is connected with the movements of the trade-wind region from season to season. It would be out of place here to enter into details regarding these movements and the modifications of the winds in the countries round the Mediterranean consequent thereon; it is enough to mention that the trade-wind region oscillates from north to south with the position of the sun in the heavens, advancing farthest to the north in summer when the sun stands highest, and retreating to the south in winter when the sun is low. The consequence of this oscillation is that, while the whole of the northern zone is exposed all the year round to Atlantic winds from the south-west, the Mediterranean region is so chiefly in

winter, being in summer drawn to some extent into the domain of the trade-wind blowing more or less from the north. To the ancient Greeks this summer trade-wind was known in the east of the Mediterranean, where it is most marked, as the Etesian—that is, annual wind; but, though less steady and regular farther to the west, it can still be made out in Malta, Sicily, and Calabria, and in the south-east of Spain as far north as Murcia.[1] This trade-wind is always dry, and accounts in a large measure for the rainlessness in summer of the region marked off on the map as having that character. This limit, it should be mentioned, is adopted from a map accompanying the treatise just referred to, and has been drawn so as to include all places with a smaller summer rainfall than 50 millimètres (2 inches). It will be observed that it includes fully the half of Spain, and that, in general, Spain is the least favoured country in Europe as regards rainfall; but here it is only necessary to call attention to that fact, which will be more appropriately considered, along with various other special features of the rainfall of Europe in the chapters devoted to the different countries.

We must not leave unnoticed, however, the indications given in our rain-chart as to the period of the year when the rains are most abundant even in the zone in which they are pretty equally distributed throughout the year. The chart shows that the autumn rains are most plentiful in the British Isles and Norway, in the west of Europe generally, and likewise in all mountainous regions. This is very easily explained in accordance with the general facts already mentioned with regard to the occurrence of rain. It is during the autumn months that the difference of temperature is greatest between the air above the land in the parts indicated and that above the water. Evapor-

[1] T. Fischer, *Das Klima der Mittelmeerländer*, p. 19.

ation is still going on with considerable rapidity in the North Atlantic, but the land is already cooled and the atmosphere above less able to retain vapour in suspension.

In the plains of eastern Europe, again, the heaviest rainfall occurs in summer. If the reader will refer to the Isothermal Chart he will see that in winter the isotherms in eastern Europe run from north-north-west to south-south-east. The consequence is that the equatorial rain-bearing winds, blowing at right angles to these lines, get more and more drained of their moisture as they advance. The number of days on which rain or snow falls in winter does not diminish greatly as far as the Urals, but the total quantity of the precipitation gets materially reduced. In summer, on the other hand, the moisture that is condensed in rain is not for the most part directly derived from the Atlantic, but is of local origin. The excessive heat of the sun leads to a great amount of local evaporation while the air is still, and when cold supervenes from any cause the moisture is again condensed in heavy showers accompanied by thunder and lightning.[1] These rainfalls are accordingly less refreshing to the ground than those of western Europe, and are quite compatible with a considerable degree of drought, for they occur at intervals with great violence, and when they are past may leave the surface of the earth for weeks together exposed to the effects of a glaring sun by day and extreme cold by night.

There are still certain local phenomena connected with the climate of Europe which it will be more convenient to treat of here from a general point of view than to relegate to the chapters dealing with the various sections of the Continent. These are the winds known as the *mistral* and *bora*, the *föhn* and the *sirocco*.

The first two of these are essentially the same in

[1] Woeikof, *Die Atmosphärische Circulation*, p. 14.

character, though they are called by different names in the different localities in which they prevail. The mistral, that is, the *magistral* or masterful wind, is a north-west wind which blows on the coasts of the Mediterranean, from the mouth of the Ebro in Spain to the shores of the Gulf of Genoa, but is specially prevalent in the French portion of this area round Marseilles, and which deserves its name on account of the extreme violence by which it is generally characterised. In France it has been known to overturn railway trains, and the injury which it does to vegetation, and more particularly to trees, which it will sometimes almost entirely strip of their foliage,[1] renders it, as an old proverb intimates, one of the most detested scourges of Provence. Its injurious properties are increased by the fact that it is always of a piercing icy coldness, like our east winds. Still its influence is not wholly a noxious one. It renews and purifies the air, the few valleys in the south-east of France which are wholly sheltered from it being mostly unhealthy; and in spite of its coldness both Grisebach and Fischer are agreed in maintaining that it tends on the whole to increase the mildness of the climate in the region where it prevails, at least wherever there is partial shelter from its direct action. It does so because it is always dry, and accompanied by a cloudless sky, and thus promotes the warming of the soil by the rays of the sun.[2] The cause of this wind is the constant difference in temperature between the plains on the coast, where the air is rapidly rarefied by the heat of the sun, and the snow-clad heights of the Cevennes and the Alps, and hence there is no season of the year quite free from this scourge, though it is generally most violent, at least in Provence, at the end of winter and in the early spring. At Marseilles it blows on an

[1] Fischer, *Klima der Mittelmeerländer*, p. 34.

[2] Grisebach, *Vegetation der Erde*, i. 251; Fischer, *Klima*, etc., p. 35.

average 176 days in the year, sometimes continuing for days together without interruption; sometimes ceasing at night in order to return with equal violence the following day. At the mouth of the Ebro valley, where it goes by the name of *cierzo* (as at Narbonne it is called *cers* or *cierce*), it occurs chiefly in autumn and winter.

The *bora*, the name of which is no doubt an abbreviated form of *boreas*, the Latin and Greek for the north wind, is a wind of similar character which blows on the west coast of the Balkan peninsula, from Trieste to Albania. Like the mistral, it is always cold and dry, and is generally accompanied by clear sunshine, though not so regularly as the former; but it is specially characterised by its liability to blow in repeated gusts, which gradually become less violent and less frequent as the bora dies away. In some cases it is due to precisely similar causes to those which give origin to the mistral, but more frequently it can be regarded as nothing else than a north wind which has been held back by the barrier of mountains, but blows over the plains with all the greater violence when it finds a gap through which it can make its escape (see AUSTRIA, Karst Region).

The *sirocco* is a wind of which various accounts have been given, and this appears to be due to the fact that the name is actually bestowed on winds of very different character and origin. Throughout Italy, on the south-east of France, and all along the west coast of the Balkan peninsula, the name is applied to moist south-east, south, or south-west winds, which are in no way injurious, and have none of the characters for which the sirocco is proverbial. The true sirocco prevails chiefly in Malta and Sicily, though it may extend as far north as Rome, and is even a greater scourge to the regions visited by it than the mistral is to Provence. Like the mistral and the bora, it is violent and dry; but in other respects it is a

complete contrast to these. Blowing from the south instead of from the north, it is not cold, but on the contrary characterised by scorching heat, which may amount even at midnight to about 95° Fahr.; and the sky instead of being clear is filled with a leaden-coloured haze, through which the rays of the sun can scarcely pierce. Under its breath the ground cracks, vegetation dries up and withers, the leaves of the trees, if it continues to blow for some days, roll up and drop off. Every chink gets filled with the fine dust which it carries. If it occurs at the time of blossoming of the vine or the olive the whole year's harvest may be lost. It is frequently said to be confined to the summer months, but this is incorrect. It may, in fact, occur at any season of the year, and it has the same characteristics in January as in July. Most commonly it blows in spring. As a rule, it lasts for three days, seldom longer, and it may not last more than a few hours.

A wind on the south-east coast of Spain with precisely the same characteristics is known under the name of *leveche*. At Almeria it is specially frequent and violent, but it seldom extends so far west as Malaga. The *solano*, which also visits these regions, and is often confounded with the sirocco, is, in fact, a wind of a totally different character, being generally a moist east wind.

The origin of the sirocco has been much disputed. Dove believed it to have its birth in the West Indian seas, whence he supposed that it travelled eastwards and northwards with the general north-easterly air-current known as the anti-trade; but there is now a growing opinion in favour of the view that its true birthplace is in the Desert of Sahara, with which origin its most striking characters, its heat, its haze and dust, and its extreme dryness, are in obvious harmony.

The *föhn* agrees with the sirocco in being a south wind; it yields to none of the others already mentioned

in the violence with which it sometimes blows. It prevails in the valleys opening to the north on the north side of the Alps, and, above all, in that of the Reuss. The town of Altorf in that valley has on several occasions been destroyed by conflagrations occasioned by its fury, and the law now requires that all fires in the town must be extinguished on its approach. But on the whole, the föhn is a beneficent wind, and is welcomed in the valleys where its influence prevails. It blows chiefly during winter and spring, and being warm and dry, is known as "the great snow-melter," from the extraordinary effect it has in clearing away the snow from the mountain-sides. Professor Dufour has shown that in one case when the föhn raged for two days in the valley of the Reuss and the continuation of that valley, in the Lake of Lucerne, the temperature within its domain was from 6° to 9° C. (11° to 16° F.) above the normal in northern Switzerland. In the lower valley of the Inn, which is also affected by it, the cultivation of maize is rendered possible by the elevation of temperature due to its influence.[1]

Regarding the origin of this wind the same difference of opinion has obtained as with respect to that of the sirocco; but in this case there seems now to be little doubt that the birthplace of the wind is to be found far away in the equatorial seas. The föhn is in fact only a part of the equatorial return current. Though dry in the valleys down which it blows, it has a totally opposite character on the opposite side of the mountains which it has to climb before descending the valleys. In being forced up into the higher regions of the atmosphere on the southern slopes it loses all its moisture, and as it thereby gains the heat which was latent while the moisture was still in a state of vapour, it does not lose so much heat on the whole during the ascent as it gains on the

[1] Supan, *Statistik der unteren Luftströmungen*, p. 82.

northern slopes during its descent. Hence both its great warmth and its great dryness and evaporating power.[1] According to the calculations of Hann, it is cooled during the ascent at the rate of about $\frac{1}{2}$° C. in 100 mètres (1° F. in 300 feet), but heated by compression during its descent at just double that rate.

11. *Flora and Fauna.*

Both as regards the flora and the fauna Europe has the character of a peninsula appended to Asia. This was clearly the case with respect to its climate, and just as with the climate, so also with the vegetable and animal life, the barrier of mountains and highlands running east and west forms a well-marked line of demarcation. Considering the general aspect and the affinities of the European flora, Grisebach has assigned almost the whole of Europe to three great regions, each of which is continuous with portions of the same regions in Asia, the most southerly also with a portion in Africa. With respect to the general character of the fauna, again, Wallace, following Sclater, refers the whole of Europe with the north of Africa to the *Palœarctic Region*, which includes also the whole of Asia north of the Himalayas, and this region is subdivided into two sub-regions, one comprising the countries round the Mediterranean, and the other all the rest of the continent.

Looking more particularly first at the flora, we find that only a very small portion of the mainland of Europe in the north-east belongs to the true Arctic region in which the characteristic vegetation is that of the mosses and lichens forming the toundras of north-eastern Russia and northern Siberia. The rest of Europe north of the Alps, and the Pyrenees in the west, and north of the

[1] See Heinrich Wild, *Ueber Föhn und Eiszeit*, Bern, 1868.

steppe-region of Russia in the east, is referred by Grisebach to what he calls the Forest Region of the Eastern Continent, which extends right across Asia in corresponding latitudes. Throughout this vast area the same general character stamps the vegetation; and the constituents of the flora, to a large extent the same throughout the whole area, vary so gradually that no sharp line can be drawn through any part of it. The whole area is fitted for the growth of forest trees such as are found in our islands, though the forests that formerly existed have in a great measure given way before the advance of cultivation. What is frequently known as the "Germanic flora," from the fact that Germany forms its centre in Europe, is the characteristic flora of the whole region.

South of the Pyrenees and the Alps all the countries bordering on the Mediterranean in Europe, Asia, and Africa, have at least in their lower levels a flora of a very uniform aspect, and with different natural affinities from those of the Germanic flora on the north. This is the region of the laurel and myrtle, the holly and holm-oak, the pistachio-nut, the carob or locust-tree, the caper and the dwarf-palm, and among cultivated plants the orange and the olive. So close is the agreement between the floras north and south of this great inland sea that this fact alone is enough to prove the recent land-connection between the northern and southern shores spoken of in a previous section. M. Cosson, who made interesting investigations concerning the floras of the Barbary States and southern Europe, ascertained that out of 434 plants collected on the maritime district of the province of Constantine only thirty-two were not to be found on the southern coasts of Europe, and though a gradual change is observable in the Mediterranean flora from west to east, the same correspondence is maintained between the opposite shores at different parts.

The general aspect of the Mediterranean flora is in accordance with the warmth and dryness of the climate in summer, and hence the most characteristic vegetation consists in the so-called *maquis*, that is, evergreen shrubs or small trees, such as most of those above mentioned, with thick leathery leaves adapted to retain moisture. How entirely this maqui form is the result of a climatic adaptation is shown by the fact that the twenty shrubs of the Mediterranean region resembling the oleander in habit belong to fifteen genera, and these to fourteen different botanical families.[1] Thorny and leafless shrubs and grasses (grasses like the esparto), all having the same drought-resisting power, are likewise abundant, especially on the tablelands of Spain.

Some of the forms which are now among the most characteristic features of the vegetation of this region have been introduced by man within historical times, and have since run wild. The most notable of these perhaps are the cochineal-fig and the so-called American aloe, which were introduced from the tableland of Mexico in the sixteenth century; and it must also be remembered that some of the cultivated fruits, for which the Mediterranean is now celebrated, such as those of the orange tribe and the date, are not of European origin, and in some cases took long to acclimatise. Even in Pliny's time none of the orange tribe was cultivated in Italy. Vain efforts were repeatedly made to introduce the citron, the cultivation of which did not succeed till the third century A.D. Lemons and oranges were established much later, though they are now successfully cultivated even in southern Tyrol. And it was with equal slowness that some other trees, such as the chestnut and the peach, which have now advanced much farther north than the Mediterranean, were brought to yield good fruit within that area.

[1] Grisebach, *Vegetation der Erde*, i. 294.

The annual course of vegetation in the Mediterranean region is just as different in its general aspect from what we find in the north of Europe. The period of repose, which in our part of the continent falls in winter, occurs to the south of the 40th parallel of latitude,—the latitude of the middle of Spain, the south of Italy, and the north of Greece,—in summer. The maquis are enabled by their leathery leaves to pass this period of repose in full leaf without injury. Not till after the first heavy shower of rain in October does vegetation begin to revive. The seeds of annual grasses and herbaceous plants begin to germinate, the parched ground becomes again covered with a delicate fresh green; the flowers begin to bloom afresh, and the evergreen trees and shrubs put forth young leaves. North of the parallel of 40° N. this autumn vegetation is brought to an end in the middle of December, but farther south it goes on all through our winter, and then too a whole host of true winter plants begin to bloom, though destined to vanish again in March. In this latter month begins the much richer, more luxuriant, and more varied spring vegetation, which attains its climax in the month of April. Now the fruit-trees that shed their foliage become clothed again with leaves and covered with blossom; now the orange groves scent the air for miles around. Orchids and all manner of bulbous plants, lilies, irises and numerous others, rock-roses, lavenders, crucifers, and Compositæ appear in innumerable crowds and exhibit the most splendid variety of colour.[1]

The effect of the mountain barrier in marking off two different floras on the north and south is almost everywhere very observable, but nowhere is the transition more sudden than where we pass from the highlands of south Germany to the plains of Hungary. The gradual

[1] Fischer, *Klima der Mittelmeerländer*, pp. 32, 33.

rise in the land from north to south in Germany causes a remarkable uniformity in climate in that region, the rise of temperature due to a more southerly latitude being steadily counterbalanced by the lowering due to the increase of elevation. Hence also the flora remains strikingly constant in its constituent elements, but when we descend to the plains of Hungary, watered by the Danube and Theiss, the so-called *pusstas*, the scene is completely changed. The climate and vegetation are here different both from those of the north and those of the Mediterranean region in the south. Surrounded on all sides by mountains, these plains are to a large extent deprived of moisture from whatever quarter the wind may blow, but being thus exposed directly to the rays of a burning sun, are as arid and parched as the tablelands of Spain. Here consequently the vegetation has the same aspect as in the steppes of southern Russia, with which the pusstas of Hungary are referred by Grisebach to a separate region of vegetation extending eastwards into Asia along the southern frontier of the Forest Region. According to Grisebach this whole region is characterised by a climate too dry for the growth of forests, but there can be no doubt that he has exaggerated the summer drought of much of that part of Russia and Roumania within the line which he has drawn as the north-western limit of the region. This line runs from about 53° N. in the east to the Danube, where that river begins to form the boundary between Roumania and Bulgaria, and it has been pointed out that even to the south of that limit the climate is in some parts sufficiently moist to support pretty extensive stretches of forest.[1] Nevertheless it is undoubted that in this part of Russia the climate becomes drier and drier as we go eastwards, and that here as in the isolated pusstas of Hungary the vegetation has an

[1] Woeikof, *Die Atmosphärische Circulation*, pp. 18, 19.

aspect quite peculiar. Nowhere does the vegetation form a continuous covering of any sort for the soil, and the principal vegetation consists of tall coarse grasses and shrubs. Here, as well as in the Mediterranean region, the spring is ushered in by the sudden appearance of a great variety of beautiful bulbous plants—narcissuses, tulips, hyacinths, crocuses, asphodels, etc.

Though this steppe region, as regards its general aspect, is perhaps entitled to be ranked as forming a separate section of the European flora, it does not hold so isolated a position when considered with reference to the natural affinities of its constituent elements. When looked at from this point of view it is seen to be only a peculiar part of the Mediterranean flora, and to have entered on its European domain from the south, that is, from the eastern or Asiatic portion of the Mediterranean region. It is at any rate strikingly divergent in its natural affinities from the Russian flora of the Forest Region immediately to the north, and these relations are explained by Engler as most probably due to the fact that the steppe flora immigrated from the south as the land, formerly submerged, gradually rose above the surface from the south northwards, so that the new land was settled by southern plants before the northern ones could gain access to it.[1]

Before leaving the consideration of the European flora, some attention should be given to the effects wrought on the distribution of vegetation by another recent event in the geological history of Europe—the Ice Age. The immediate effect of the Ice Age was of course to extinguish for the time the vegetation over the regions where the ice-sheets actually spread; but it has had some other effects of a more lasting nature. By

[1] Engler, *Versuch einer Entwickelungsgeschichte der Pflanzenwelt*, i. 184-86.

lowering the temperature of the plains adjoining the ice-fields it permitted these plains to be occupied by plants capable of standing a severe climate. When more genial conditions returned, the plains were reoccupied by more vigorous competitors for subsistence, and the former occupants were driven up the mountains to find a refuge there, or compelled to retire northwards with the ice. Hence the scattered distribution of what are known as Arctic-Alpine plants, that is, such as are found only in the Arctic regions, and on Alpine heights between the tree- and the snow-limit on the mountains. Hence also the similarly scattered distribution of some other forms, which are not Arctic, but which could not now migrate across the plains by which their different seats are separated, or by which they are isolated from their nearest allies. But there can be little doubt that another effect of the Ice age in Europe was wholly to extinguish there certain forms which were present during the Pliocene Epoch. Such, for example, are the Canary laurel, the tulip-tree, and the magnolia, the last two of which are still found in America, in latitudes corresponding to those of Europe. In their extinction we see an effect not only of the Ice age, but also of the sea and mountain barriers in the south. In America such forms had, on the advent of glacial conditions, a way of escape southwards, whence they were afterwards able to return to their northern seats; but in Europe they were, so to speak, crushed up against the Pyrenees and the shores of the Mediterranean, and thus wholly destroyed.

Regarding the *fauna* of Europe little need be said. The prevailing forms of the sub-region constituted by central and northern Europe are well known. Among mammals there are only two genera absolutely peculiar to it, the chamois (*Rupicapra*), inhabiting all the mountains of central Europe, and the aquatic insectivorous desmans,

PERCENTAGE OF FIELD & GARDENLAND.

PERCENTAGE OF WOODLAND.

Percentage of Woodland.

	(1)	(2)	(3)
Sweden	55.0	59.5	57.6
Russia	40.0	40.0	39.0
Finland		30.0	27.1
Austria-Hungary	30.0	30.0	29.0
Russia			25.6
Luxemburg			23.0
Germany		25.0	25.7
Roumania, Servia, Montenegro		24.0	
Switzerland	20.0	21.0	19.7
Norway	15.0	17.0	16.1
Italy	10.0	10.0	10.7
Belgium	12.5	7.0	10.8
France	14.0	17.0	15.0
Greece	11.0	14.0	11.0
Spain (7½ per c.)	7.0	7.0	20.0
Netherlands	7.0	7.0	6.6
Denmark	6.0	6.1	6.0
British Isles		6.0	5.0
England	4.0		4.4
Scotland	4.0		6.0
Wales	9.0		7.0 (1905)
Ireland	1.0		1.0
Portugal (7½ per c.)	1.0	0.5	0.0

1. Compiled by W. Bagley, F.S.S., from the Official Reports on the Census of Land in Foreign Countries, and the Appendix to the Agric. Statistics of the U. Kingdom.
2. From Meyer's Konversations-Lexikon (5th Annual Supplement (1905-06).
3. Stockhill, Die Staaten Europa's Bonn 1906.

PERCENTAGE OF THE TOTAL PRODUCTIVE SURFACE.
(Including Field and Gardenland, Woods, Meadows and Pastures.

RATE OF INCREASE OF POPULATION.

Rate of Increase of Population since about 1860.

(See Statistical Appendix, p. 106.)

Below 3 per 1000 per ann.	France
Between 3 & 5	Spain
" 5 & 7	Switzerland
" 7 & 9	Austria
" " "	Belgium
" " "	Italy
" " "	Norway
" 9 & 11	Germany
" " "	Greece
" " "	Netherlands
" " "	Scotland
Above 11 per 1000 per ann.	England and Wales
" " "	Denmark
" " "	Portugal
" " "	Russia
" " "	Servia
" " "	Sweden

Note.—The mean rate of increase per 1000 per annum, 1881–1901, for the United Kingdom was 9.5.

England and Wales	10.14
Scotland	10.10
There was a decrease in Ireland of	4.34

or musk-rats (*Mygale*), of which there are only two species, one inhabiting the rivers of south Russia and the other those of the French Pyrenees. Almost confined to this sub-region are the *Spalax* or mole-rat, found in eastern Europe and western Siberia, and the *saiga*, a large-nosed antelope, with a similar distribution. The only genus of mammals peculiar to the Mediterranean sub-region found in Europe is the Dama or fallow-deer. Among the characteristic genera not found in the other sub-regions of the Palæarctic region, but found in Europe, are the *Genetta* (the civet), *Herpestes* (the ichneumon), the hyæna, and porcupine. A wild sheep, *Ovis Musimon*, is still to be seen among the mountains of Sardinia, Corsica, and the south-east of Spain. Bears, badgers, pigs, stags, fallow-deer, goats, polecats, and numerous other mammals found in north Africa, but not in the rest of that continent, all bear witness to the recent land connection with Europe already referred to in previous sections, and serve to justify the association of that strip of the African continent in the same sub-region with southern Europe and western Asia.[1]

The Ethnology of Europe will be specially dealt with in an appendix by Prof. Keane.

[1] See Wallace, *Distribution of Animals*, chap. x.

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CHAPTER II.

FRANCE.

1. *Outline and General Relief of the Land.*

FRANCE, as depicted on our maps, presents the form of an irregular polygon, surrounded in part by oceanic and in part by land boundaries. In consequence of the coast-line being for the most part free from marked sinuosities, the seaboard is not large in proportion to the area of France, but this is abundantly compensated by the many navigable rivers and canals which intersect the country.

Though not so rugged as its neighbours to the south and south-east, France is far from being on the whole a level plain, as is apt to be fancied by those whose knowledge of the country is derived mainly from an acquaintance with the northern departments. It is in fact to a large extent a mountainous land. Almost all the west is composed of level or undulating tracts, the principal exception being presented by the rough hilly country, mostly under 1000 feet in height, which runs from east to west along the northern half of Brittany and the southern half of Normandy. But the plains gradually ascend eastwards to a region of mountains and plateaux of considerable elevation. It is true that the highest summits of France belong to the frontier ranges of the Alps and the Pyrenees, but in the very heart of the country there are many peaks higher than the highest in our own islands. These rise from a large plateau occupying

almost all the south-east, and surrounded on the north, east, and south by the valleys of the Loire and Saône, the Rhone, and the Aude and Garonne. The Canal du Centre, connecting the Loire and Saône, indicates the lowest line of the depression that cuts it off on the north from another lower and less extensive plateau, and the Canal du Midi connecting the Aude and Garonne similarly marks out the depression severing it from the Pyrenees. On this plateau, which rises in some places abruptly, in other places in terraces from a level of about 1000 to one of about 3000 feet in height, we have the Cevennes, the mountains of Forez, and the mountains of Auvergne, the last being the highest of all, and crowning the most elevated part of the region. The northern plateau, to which belong the Faucilles, the Langres, and the Ardennes, is under 2000 feet in height. Its eastern boundary is formed by the Vosges. We will begin our more detailed description of the physical features of France with the level country in the west.

2. *The Western Seaboard—The Landes.*

As far north as the mouth of the Garonne the coast follows a perfectly straight and monotonous line, broken only by the deep inlet forming the so-called *Basin of Arcachon.* It is probable that the growth of the sand-bar at the mouth of this sheet of water will eventually cut it off from the sea. The lowland country, watered by the streams which flow from the northern slopes of the Pyrenees, is mostly covered with superficial deposits of gravel, sand, and mud, with quagmires here and there of considerable extent. Between the Adour and the Garonne, from Bayonne to Bordeaux, the arid moors of the "Landes" extend along the ocean, whose shores are here skirted by elevated dunes.

These dunes stretch for nearly 70 miles along the coast, over a strip of country with a mean breadth of more than 4 miles. They vary in height from 100 to 160 feet, and slope seawards at an angle of 25°, and landwards at one of 50°. Being composed of loose sand, their outlines are continually shifting, according to the play of the winds. On the whole they have a tendency to encroach farther and farther on the interior. This encroachment appears to have begun within historical times. Montaigne, in the sixteenth century, notices it as a phenomenon of comparatively recent occurrence. It is in fact largely due to the ignorance and recklessness of the inhabitants, who did not discern the nature of the protection afforded by the forests which formerly existed on these coasts, but which they felled for the sake of the immediate profit. Within the present century, however, great improvement has been effected by reversing the process that led to the encroachment of sand. A forest of sea-pine, 7 miles in breadth, has been planted along a strip stretching from the Adour to the Gironde, and this forest serves as a barrier to protect the region within. This inner region constitutes the *Landes* proper, a district which can scarcely be described as exhilarating. The wearied eye will often seek in vain for a resting-place, and discovers nothing but interminable plains, on which a few years ago there were scarcely any signs of human life, except where the weird figures of shepherds were to be seen flitting about perched on high stilts. Almost the whole region was a desert infected with malaria. But here also great improvements have been effected of late years. An engineer named Chambrelent having carefully surveyed the district, found that it had on an average a fall of 1 in 1000 to the sea, and then drew up a scheme for draining and fertilising it. In 1857 a law was passed by the French Parliament, obliging the communes interested to carry

this scheme into effect, and this has now been done over a large area with the most beneficial results. The country has been intersected by canals running in every direction; millions on millions of trees have been planted; the desert has disappeared; the quagmires have been reduced in number and extent; the Landescots, as the people are called, have less need to resort to the aid of stilts; and the malaria has been banished. Villages have

SCENE IN THE LANDES.

arisen in hundreds, and the communes have enriched themselves to such a degree that they have been enabled to construct excellent roads, build numerous schools, erect fountains, and provide everything that could conduce to the improvement of the people. The entire plain of the Landes has an extent of something like 5400 square miles. Between the dunes and the Landes stretches a chain of shallow lakes which have been cut off from the sea by the formation of the dunes, and which are known

to the French as *étangs*. The largest of these in this district is the *Étang de Cazau*, which occupies an area of about 15,000 acres.

North of the Gironde the French coast loses its monotonous outline, but it still remains low and bordered by dunes as far as the department of Finistère in the west of Brittany. The dunes, however, are low, and serve only to cut off from the sea a fringe of saline marshes which were formerly a means of support for the inhabitants of those regions, but in consequence of the cheapening of salt in modern times have become comparatively useless. In the west of Brittany the coast becomes rugged and dangerous, and something of the same character is continued along the north coast of Brittany and the Atlantic coast of Normandy (dep. Manche). The islands that skirt the coast between the Gironde and Normandy,—Oléron, Rhé, Yeu, and Noirmoutier, Belle Isle, Groix, Ouessant or Ushant off Brittany, and the Channel Islands off Normandy,—all have the same geological formation as the neighbouring parts of the mainland, from which they have beyond doubt been separated. Along the whole of the west coast indeed there is abundant proof that the land has suffered loss partly by subsidence and partly by marine erosion. Yet there has been in some places a compensatory gain in land wrested from the sea. The ancient Gulf of Poitou, for example, is now converted into arable and pasture land.

3. *The Coast and Uplands of Brittany.*

The isolated highlands of Brittany, the ancient *Armorica*, consist mainly of Silurian rocks and of granite and gneiss, culminating in the rugged Monts d'Arrée and de Menez (1312 feet). The parallel chain of the Black Mountains (1070 feet) branches off at Mont Menebre

(1112 feet), from the last-mentioned range, and terminates in the headland of Crozon.

The main ridge of the Monts d'Arrée continues to skirt the north coast at a mean distance of 12 or 13 miles, its northern slopes being steep and abrupt, while the southern spurs merge in an undulating hilly region.

In the Bay of St. Michel, in the angle between Normandy and Brittany, is the famous *Mont St. Michel*, which, like its namesake in Mounts Bay on the Cornish coast, is connected with the mainland at low water, but forms an island at high water. The resemblances between Brittany and Cornwall are indeed singularly close, extending to the geological structure, the mineral wealth, the megalithic monuments, and the ethnological characters of the inhabitants. *Finistère* is the "Land's End," and near Quimper there is a French "Cornwall" or *Cornouaille*, the *Cornu* or "horn" of the Welsh.

It is worth noting that the tide in some of the bays on the coast of Brittany, such as that of St. Malo, and of St. Michel, rises to an extraordinary height, reaching at times as much as 50 feet.

The Channel Islands, occupying the large bay between Normandy and Brittany, consist of *Jersey* and *Guernsey*, the largest and most important of the archipelago, besides the romantic rock of *Sark*, and the strongly-fortified island of *Alderney* (the "Aurigny's Isle" of Macaulay's ballad of the Armada), together with many rocky islets too insignificant to require notice here. Although lying within sight of the French coast these islands form part of the British dominions.

The work of destruction, by which they have been severed from the mainland, is even now going on, so perceptibly in some places that the Channel Islands must, in the distant future, disappear altogether. The separation from the mainland is very recent. In the

time of Julius Cæsar the island of Jersey is said to have been divided from the coast of Gaul by only a narrow strip of water, which could be crossed on a plank; and even at the present day a rise of about 10 fathoms (in some places only 5 fathoms) would bring the whole area between Cape La Hague and Treguier, on the north coast of Brittany, above the surface of the water, reuniting the Channel Islands to France.[1] The total area of the Channel Islands is 73 square miles, of which Jersey occupies 45.

4. *Normandy and the North.*

To the east of the peninsula of Cotentin, which terminates northwards with Cape La Hague, and where is situated the formidable naval station of Cherbourg, the *Baie de la Seine* forms a broad bight in the coast-line, along which, at some 5 miles from the shore, runs the dangerous reef of the Calvados rocks (*Rochers de Calvados*) for a distance of about 25 miles, while in the eastern angle of the bay a deep estuary marks the mouth of the Seine. Along this picturesque coast lie the much-frequented watering-places of Trouville-sur-mer, Deauville, and Étretat.

Normandy is one of those lands over which history and poetry have thrown a halo of beauty and romance. And yet the Normandy of to-day is not especially romantic, if we except, perhaps, the strips of rocky coast lashed by the Atlantic surf. The land, watered by the tranquil Seine, is pleasantly varied by undulating hills and dales. Here are no frowning mountains, no exten-

[1] The encroachment of the sea on the coast of Brittany and on the Channel Islands has lately been the subject of an interesting work, *Les Mouvements du Sol sur les Côtes Occidentales de la France, et particulièrement dans le Golfe Normanno-Breton*, by Alexandre Chèvremont. Paris: Ernest Leroux, 1882.

sive and sombre woodlands; all is light and cheerful, carefully tilled, and green and smooth, with few villages, but everywhere interspersed with shady little groves temptingly inviting the wayfarer to explore their coy recesses. On a nearer approach we find an earthen wall, often planted with a double row of beech, maple, or alder-trees, concealing a large grassy sward planted with fruit-trees, amidst which graze a magnificent breed of cattle in close proximity to the neat, well-constructed farmstead. The hilly woodland country of Calvados is known as the Norman *Bocage*, while the high ground to the south forms the so-called "Norman Switzerland."

Much of the coast of Normandy and north-eastern France consists of calcareous strata, of Jurassic and Cretaceous age, which are worn by marine action into sweeping outlines, giving to the coast-line a succession of flowing curves, well illustrated between Havre and Dieppe, and onwards from Upper Normandy into the north-eastern departments.

Passing from Upper Normandy into Picardy, the resemblance becomes more marked between the rocks of the French coast and those of the opposite coast of Britain. The *Manche*, or Channel, here narrows to the *Pas de Calais*, or Strait of Dover, which has been formed partly by marine erosion, and partly by subsidence of the land. The rocks of the Weald of Kent and Sussex were evidently at one time continuous with those of the Bas Boulonnais; but while there are great resemblances, there are also marked differences. Thus the occurrence of Carboniferous and Devonian rocks near Boulogne is not paralleled on the English side. Even the sub-wealden boring near Battle, although carried down to nearly 1000 feet, did not reach Palæozoic rocks, and lent no support to the notion that the coalfield of the Pas de Calais had a corresponding coal-bearing area within

moderate depth in the extreme south-eastern angle of the English area.

Along the coast of the department of Pas de Calais there has been considerable gain of land at certain points, while elsewhere the sea has encroached. Deposits of silt have been largely formed near the mouth of the Somme, and have also added new land near Cape Gris-Nez. The inhabitants of the seaboard of the north of France have not been slow in reclaiming land, and protecting it by means of dykes, after the manner of the Dutch.

5. *The Mediterranean Seaboard.*

Mediterranean France is divided into two distinct sections—one to the east and the other to the west of the mouths of the Rhone. The eastern section presents bold cliffs along the coast, and in the character of its flora is essentially African. Distinct from the Maritime Alps on the extreme east of France are the *mountains of the Moors*, with the chain of *Esterel* at the back, forming a conspicuous feature in the geography of Provence. Some of the most famous winter resorts are situated on this coast, such as Mentone, Nice, the little independent principality of Monaco, Cannes, and the Islands of Hyères.

Immediately west of Marseilles begin to appear the remarkable lagoons and marshes, forming a prominent feature of the entire Mediterranean seaboard as far as the Pyrenees. They lie between the mouths of the streams here reaching the coast, the Hérault, Orb, Aude, Ogly, Tet, and Tech, and occur most frequently on the large island, 554 square miles in extent, formed by the two branches of the Rhone and the coast-line. Here lies the extensive marsh of Valcarès, imparting a Dutch-like aspect to this perfectly flat district, over which graze herds of cattle, flocks of sheep, and a breed of half-wild

horses. Near Marseilles is the *Étang de Berre*, an inland sea formed by an arm of the Mediterranean, from which it is separated only by a rocky ridge.

Along the right or western bank of the Lower Rhone as far as the Pyrenees, and westwards to the Garonne, extends the fruitful province of Languedoc, which is intersected by the chain of the Cevennes, and presents for the most part a low and sandy beach, quite unlike the bold cliffs of Provence.

6. *The Central Highlands.*

The Cevennes form the south-eastern boundary of the central highlands of France. In the more comprehensive sense of the term they include several mountain ranges and groups, beginning in the south-west with the *Black Mountains*, which rise to nearly 4000 feet in height, and comprising in their general north-easterly course the *Monts de l'Espinouse, Monts Garrigues* (with which the Cevennes proper begin), and the volcanic district of Mont Mézenc (upwards of 5500 feet), where the Cevennes proper may be said to terminate. The series is continued northwards by the Monts du Lyonnais and Monts du Charolais, the latter of which descend to the depression occupied by the Canal du Centre.

On the east these mountains sink abruptly down to the Rhone valley, and on the south-west the central plateau descends with equal abruptness to the basin of the Gironde, but on the north it merges more gradually with the plains.

From the mountains of Auvergne, Cantal, Haute Loire, Forez, and Limousin, composing this great table-land, some spurs stretch northwards into Burgundy and southwards into the department of Lozère. In the interior the plateau appears divided principally by two

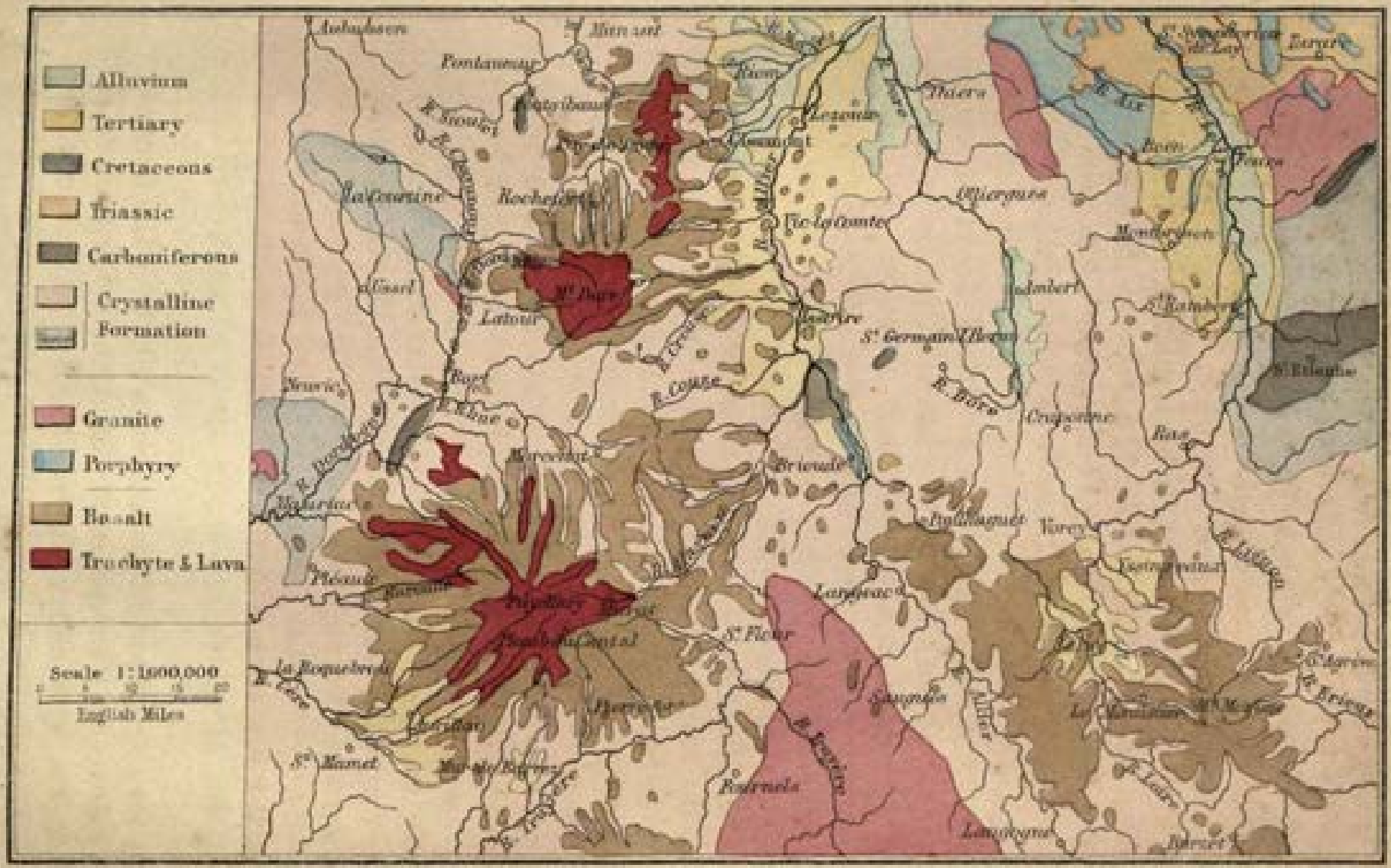
deep valleys, that of the Upper Loire, and the longer and broader basin of the Allier, which flows from the southern end of the *Margaride Chain*, not far from La Bastide, in the department of Lozère, and falls into the Loire at Nevers.

The mass of old crystalline rocks, such as granite, gneiss, and mica-schists, mainly composing the central plateau, is split by the intervening valleys of these rivers into three mountain ridges. In that between the Rhone and the Loire we have the coal-measures of St. Etienne on the north, while farther south it forms the base of the igneous group in the neighbourhood of Privas, as well as of the huge trachyte mass culminating with *Mont Mézenc*, south of Le Puy. On the tableland between the Loire and the Allier lies the grand series of extinct volcanoes stretching from Pradelles to Paulhaguet; while in the Forez range farther north, the plateau is broken by the mighty mass of the *Puy de Montoncel* (4240 feet) between Roanne and Thiers. Lastly, west of the Allier, and skirted southwards by the Lot flowing from the east, lies the long granite ridge of *Mont Margaride*. This chain stretches in a north-westerly direction, and is flanked on the west by the volcanic mass of La Guiolle, on the north by the enormous basalt and trachyte *Plomb du Cantal*, and still farther north by the *Mont Dore* (not Mont d'Or, as it is often written by false analogy with Côte d'Or), which is separated only by a narrow strip of exposed granite from the Plomb du Cantal.

7. *The Old Volcanoes of Central France.*

During that period of geological history known as the Miocene age, the highlands of central France were the scene of volcanic activity on a gigantic scale; and this activity probably continued with more or less inter-

THE VOLCANIC REGION OF CENTRAL FRANCE



mission down to a comparatively recent date. Relics of these old volcanoes may still be seen, not only in thick beds of ejected matter and wide-spread sheets of basaltic lava, but in the volcanic cones themselves, which, notwithstanding the wear to which they have been incessantly exposed since their formation, still retain to a great extent their original shape and characteristic structure.

The best known and perhaps the most interesting of these volcanic centres is that of Auvergne, where, in the neighbourhood of Clermont, a chain of about seventy conical hills, known locally as *puys*, stretches in a north and south direction for a distance of about 20 miles. These hills rise from the great central platform of granitic and gneissose rocks, which is in places covered with fresh-water strata of considerable thickness representing the sediments of ancient lakes, associated with volcanic matter locally interstratified. The chain of puys runs between the valley of the Sioule on the east, and that of the Allier on the west; the latter spreading out as a wide and fertile plain known as the Limagne. Built up mainly of scoriæ and ashes, with blocks of lava, they present in many cases well-preserved craters, while in others the brim of the crater has been broken down on one side, in consequence of the weight of the extruded lava having burst through its lip. From these breaches in the craters, streams of lava may still be traced. These fields of lava, either bare or but partly clothed with brushwood, are known to the Auvergnats as *cheires*. At Volvic the old lava is largely quarried as a building stone.

By far the largest of these volcanic hills is the famous *Puy de Dôme* in the centre of the chain. Formed of a peculiar trachytic rock known from this locality as *domite*, it rises as a rounded mass having a height of

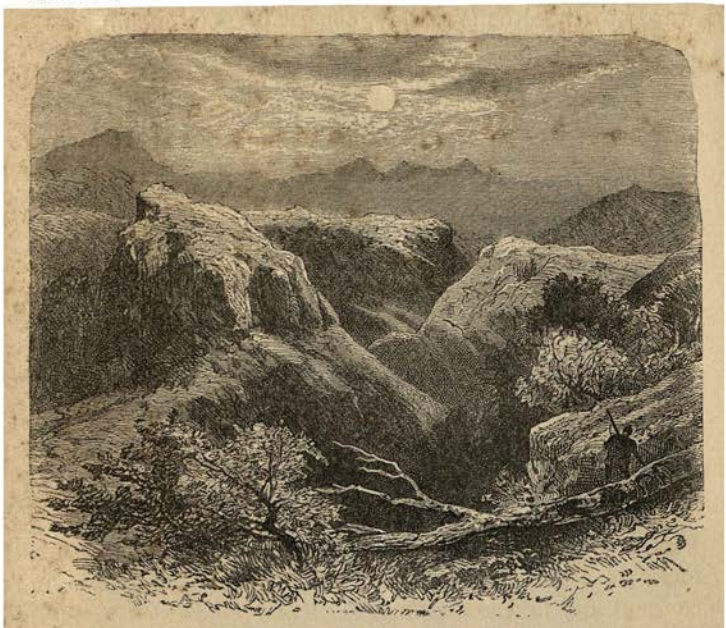
4805 feet above sea-level, and an elevation above its base of 1600 feet.

Sheets of basalt, representing old currents of lava, are widely spread over the Limagne, and have been worn through in places so as to leave isolated hills with characteristic flat tops. Such, for example, is the broad plateau of Gergovia, 2440 feet high, to the south-east of Clermont—famous as the site of the old capital of the Averni, where Vercingetorix so long withstood the legions of Julius Cæsar.

To the south of the chain of the Puy de Dôme is the noble volcanic mass of *Mont Dore*—the old *Mons Durianus*—which derives its name from a local stream called *Le Dore*. Its form is that of an irregular depressed cone, with seven or eight rocky peaks, but with no regular crater. The highest point is the *Pic de Sancy*, a pyramidal mass of trachyte rearing its summit to an altitude of 6180 feet. This height is, however, nearly equalled by some of the neighbouring peaks, such as that of Puy Ferrand. Sulphur and alum are worked in the volcanic rocks of Mont Dore, and the neighbourhood abounds in thermal and mineral springs.

The greater portion of the department of the Cantal is formed of a volcanic mass, resembling in many respects that of Mont Dore, and presenting the form of a flat cone with gently-sloping sides, furrowed by numerous radiating valleys. This gigantic cone, with a circumference of about 95 miles, had probably but one principal crater. The highest point is the *Plomb du Cantal*, 6025 feet high, whence flowed enormous currents of basaltic lava. It is believed that the volcanoes of Mont Dore and of Cantal may have been in eruption at the same period. The thermal waters of *Chaudes-Aigues* flow to the south of the Cantal, from which they are separated by the valley of the Truyère; while still farther south, in the

department of Aveyron, is the small volcanic district of *Aubrac.*



IN THE VALLEY OF MONT DORE.

The granitic range of the Montagnes de la Margaride —an offshoot of the Cevennes—divides the Cantal from the volcanic region of the Haute Loire and Ardèche. Here the culminating point is on *Mont Mézenc,* at an altitude of 5755 feet. This mountain is a mass of phonolite, or clinkstone, rising from a platform of granitic and Jurassic rocks between the Loire and the Rhone. Currents of basaltic and phonolitic lavas have spread over a wide area in the old provinces of the Velay and Vivarais. The sources of the Loire gush forth from the foot of a volcanic hill in the Haut Vivarais known as *Le Gerbier des Joncs.* Relics of the old igneous action are

found as far south as *Jaujac*, a volcanic hill with chestnut-covered slopes; while the *Hills of Coiron*, trending onwards to the Rhone valley, consist of granite capped by a sheet of basalt.

Between the Loire on the east and the Allier on the west the volcanic rocks form a series of heights stretching from Pradelles to the neighbourhood of Le Puy, the capital of Haute Loire.

Around Le Puy, especially at La Denise, are some interesting brecciated deposits consisting of volcanic matter in intimate association with the remains of the hyæna, rhinoceros, elephant, and other mammalia of Pleistocene or perhaps Pliocene age. With these were found, according to M. Aymard, two human skeletons, the authenticity of which has, however, been the subject of considerable debate. It has been supposed that "the fossil man of Denise" must have witnessed the latest eruptions of the French volcanoes, and have fallen a victim to their activity.[1]

8. *The North-Eastern Highlands.*

The highlands of the north-east are of much less height than those of the central plateau. They begin in the south with the *Montagnes de la Côte d'Or*, which stretch north-eastwards from the depression between the Saône and Loire to the sources of the Seine, terminating and culminating in Mont Tasselot (3215 feet). They are thickly covered with vineyards on their eastern slopes towards the Saône valley, and fall gently westwards to the Arroux, a tributary of the Loire, separating

[1] For details on the volcanoes of France the reader may consult the classical work of the late Mr. Poulett Scrope, *The Geology and Extinct Volcanoes of Central France* (Murray, 1858), and the more extensive work of M. Henri Le Coq, *Les Époques géologiques de l'Auvergne* (Paris, 1867).

them from the *Morvan Hills*, a granitic mass reaching an elevation of 2950 feet.

The Côte d'Or is followed by the plateau of Langres, an upland plain or tableland extending in the same direction between the sources of the Seine on the west and the Meuse on the east. Above a mean elevation of about 1600 feet there rise nothing but gently-undulating hills, whose northern slopes between the Seine and the Marne are mostly bare, with a bleak climate, unproductive soil, and indigent inhabitants. On the east, where rises the Meuse, this tableland is connected with the *Monts de la Faucille* a flat-topped mountain ridge broken by gentle undulations, throwing off short steep spurs down to the lower Saône valley, while its long northern offshoots stretch away on both sides of the Meuse. These latter mountains, after encirling the sources of the Saône, terminate at those of the Moselle in the Ballon d'Alsace, one of the principal heights of the Vosges (see GERMANY). Of their northern offshoots the chief is the long low ridge which runs along the left bank of the Meuse as far as the 50th parallel of latitude, there merging in the Ardennes at the frontier of Belgium. This ridge at first bears no distinctive name, but in its more northern part, where it forms the boundary between Champagne and Lorraine, it is known as the *Forest of Argonne*. Its eastern slopes sink pretty abruptly down to the Meuse valley, but on the west they descend towards Champagne in gentle undulations. On the east side of the basin enclosing the northern tributaries of the Rhone the elevations are higher than on the west; but they belong to ranges (the Vosges and the Jura) which lie for the most part beyond the frontiers of France (see GERMANY and SWITZERLAND).

The south-eastern frontiers of France are formed by the Pennine, the Graian, the Cottian, and the Maritime

Alps. In Savoy, just within the French frontier, stands Mont Blanc, the culminating point of the Alps and of Europe, rising as it does to the height of 15,732 feet. Several other summits (Monte Viso, Pelvoux, the Aiguille of Medje, etc.), exceed 12,000 feet in height, but as we approach the sea the average elevation declines. The principal passes in this section of the Alps are those over the Little St. Bernard on the south side of Mont Blanc, which was used in the time of the Romans; that across Mont Cenis, which was afterwards the great highway between France and Italy till it was superseded by the Alpine tunnel that takes its name from it, but which really passes under the Pass of Fréjus, some miles distant; and the Pass of Mont Genèvre, now practicable for carriages, and believed by some to have been the one used by Hannibal in crossing the Alps into Italy at the head of his army. The railway tunnel above referred to connects Bardonnèche in France with Modane in Italy, and has a total length of 40,092 feet. Though less in average height than the Alps of Switzerland, the Alps forming the boundary between France and Switzerland present in many places scenes of the wildest description, the very embodiment of rugged desolation.

9. *River Systems of France.*

One point of interest regarding the great rivers of France, is that they are all of post-Miocene date. As stated in the introduction, the Pyrenees and the central highlands of Europe all underwent a post-Miocene upheaval, and in France this had the effect of giving to the horizontal Secondary and Tertiary plains that tilt to the north and west which determined the direction of flow of most of the great rivers. The basin of the Rhone was cut off on the east at the same time by the elevation

of the plateau of Langres, the mountains of Charolais and the Cevennes; and, moreover, in Miocene times a large lake occupied the region now drained by this river after leaving the Lake of Geneva, the last relic of that older and larger lake. With respect to the present features of the hydrography, it is natural to compare the river-systems of France with those of the Iberian peninsula. The comparison is at once suggested by the fact that in both cases most of the great rivers flow in nearly parallel courses westwards to the Atlantic. The water-parting in both cases runs on the whole from north to south, and nearer the east than the west, but in both cases it leaves one great river on the east side to flow into the Mediterranean. These are the most obvious points of agreement between the river-systems north and south of the Pyrenees, but when we examine the subject more closely we find very important points of difference. In the first place the configuration of the country north of the Pyrenees allows of the development of a much larger central basin relatively to the length of the river draining it. The Tagus, which may be called the middle river in the Iberian peninsula, is a few miles longer than the Loire, which holds the same position in France, but its basin is about one-third smaller than that of the French river (see river-basins map). This fact in itself would naturally give the French stream a superiority as regards the volume of its water, but in this respect, as well as in respect of the facilities afforded to navigation, all the French rivers of the west excel those of the southern peninsula. The former advantage is due to the fact that they drain areas of higher rainfall, and the latter is in part a direct consequence of the former, partly a result of the difference in the configuration of the land.

Taking these rivers in detail, and beginning in the south-west, we meet first with the *Adour*, a river which

rises in the department of Upper Pyrenees, passes in the upper part of its course the village of Bagnères de Bigorre, celebrated for its hot baths, becomes navigable about 80 miles from its mouth, and after traversing the southern fertile part of the department of Landes enters the Bay of Biscay below Bayonne. Next comes the much more important river, the *Garonne*, which, rising in Spanish territory in the high valley of Aran, enters France through a deep defile cut in rocks of marble near St. Béat. Above Bordeaux it receives many tributaries, both on the right and left, the former (Ariège, Tarn, Lot, etc.) being the most important, while a little below the town just named it receives the most notable of all its tributaries, the Dordogne, which, after descending from the mountains of Auvergne and traversing the intervening plain, unites with the Garonne to form the large estuary of the Gironde—a tidal basin into which it is estimated that as much as 265,000 tons of water is carried at every tide. It is studded with numerous islands and ever-shifting sandbanks, while its shores suffer from continued marine erosion.

The *Loire*, the ancient Liger, rises on Mont Mézenc in the Cevennes, only about 30 miles distant from the Rhone. In the upper part of its course it flows, like the twin-stream the Allier, in a more or less northerly direction across the central plateau of France, both streams presenting examples of fluviatile erosion of the most impressive and instructive kind.[1] At Roanne, about one-fourth

[1] "Striking as are the proofs of erosion in the country of the Limagne, they fall far short of these in the Haute Loire. To be actually realised, such a scene must be visited in person. No amount of verbal description, not even the most careful drawings, will convey a full sense of the magnitude of the changes to one who is acquainted only with a glaciated country such as Britain. The first impression received from a landscape like that round Le Puy is rather one of utter bewilderment. The upsetting of all one's previous estimates of the power of rain and rivers is sudden and

of its entire length from its head, it becomes navigable. At Nevers, a little above the point where the two main head-waters, the Allier and the Upper Loire, unite, the latter cuts its way through traps and Jurassic rocks bounding the plateau, and thenceforwards flows through a lower country, though not an unbroken plain. On the north bank especially it is skirted by low hills, such as the hills of Morvan and the tableland of Orléanais. In this middle part of its course it traverses some of the most beautiful scenery in France—a region occupied by old castles and modern châteaux, by pastures and vineyards, forests and cornfields. Below Orléans, however, the river is liable to overflow its banks; to guard against which it has been provided as far as Angers with embankments. But these do not always prove sufficient, and in exceptional seasons (as in 1866) disastrous floods still devastate the surrounding region. Unlike the Garonne, the Loire receives most of its chief tributaries (Cher, Indre, Vienne, Sèvre Nantaise, etc., besides the Allier) on the left bank, the only important affluent on the right being that formed by the union of the Mayenne from Brittany, and the Sarthe and Loir from Maine and Poitou.

A little to the south of the Loire, near Nantes, is a large sheet of fresh water in a granite basin known as the *Lac de Grand Lieu*. This lake stands to the Loire in the same relation as the Neusiedler See in Hungary to the Danube, being alternately a feeder and a recipient

complete. It is not without an effort, and after having analysed the scene, feature by feature, that the geologist can take it all in. But when he has done so, his views of the effects of subaerial disintegration become permanently altered, and he quits the district with a rooted conviction that there is almost no amount of waste and erosion of the solid framework of the land which may not be brought about in time by the combined influence of springs, frost, rain, and rivers."—Geikie, *Geological Sketches*, p. 121.

of its overflow, according to the height of the main stream. Near the mouth of the Loire is a large peat-bog known as the *Grande Brière*, which is probably an old lake silted up.

The *Seine* in its meandering course forms the third great river basin of western France, lying between the basins of the Loire and the Meuse. It rises on the northern slope of the limestone hills of the Côte d'Or, at an elevation of 1463 feet; some of its tributary streams, however, draw their waters from remoter sources among the granitic and other crystalline rocks of the Morvan. It becomes navigable at Mery below Troyes, about 350 miles from its mouth. At Paris the Seine receives the *Marne*—a river of greater length though of less volume—which also takes its origin on the plateau of Langres. The Lower Seine in its sinuous course washes the old city of Rouen, below which its bed is greatly obstructed by sandbanks, until it gains the sea at Havre.

Coming now to the only great river on the east side of the water-parting, the *Rhone*, we find in many points a close parallelism between it and the Ebro, the corresponding river in the Iberian peninsula. It is true that they flow in different directions, but they agree in being confined by high mountains to a comparatively narrow basin, that of the Rhone in France being bounded, like that of the Ebro in Spain, on the one hand by a lofty frontier chain, on the other hand by the central plateau. They agree, also, in that the basins widen out towards the lower part of their course by the retirement of the limit of the plateau from the coast, and likewise in that the rapidity of their current offers in both cases considerable obstacles to navigation. In the case of the Rhone, however, this difficulty is chiefly felt in ascending the stream, for below Lyons it can be navigated with ease downwards

by large vessels as far as Arles, where the navigation is continued by means of canals to the sea, in order to avoid the rapidly-shifting sandbanks that impede the course of the stream where it traverses the delta. Above Lyons the navigation is continued for about 170 miles up the Saône, the chief tributary of the Rhone on its right bank. Looking at the map and observing the fact that the lower part of this affluent is continued in a straight line southwards by the lower course of the Rhone one might be apt to regard it as the true head-stream of the main river, but the difference in the current establishes the true identity of the main stream. The *Saône* is the river which many will remember from their school-days as that mentioned by Cæsar, under the name of the Arar, as flowing with incredible slowness, whereas the "arrowy Rhone" preserves its impetuosity from its source to its mouth. In the 200 miles from its junction with the Saône to its mouth it falls altogether 532 feet, giving an average of 32 inches to the mile. The tributaries which it receives on the left from the Alps, and on the right from the central plateau (that is, below the influx of the Saône), are all mountain torrents liable to great floods during rainy periods, but diminishing greatly in times of drought. Those on the left, the Arve, Isère, Drôme, and Durance, then dwindle away almost entirely, but those on the right are more constant, being fed by springs originating in the limestone caves of the Cevennes. Fortunately the floods to which those on both banks are liable never occur at the same time, for the slopes on either side of the Rhone basin are in each case protected from the winds which bring heavy rains to the other side. The waters of the Durance in its lower part are largely made use of by means of canals for irrigation, like those of the east of Spain. The region north of the Rhone, watered by its great tributary the Saône, with its feeder the

Doubs, and by the Ain, presents a marked contrast to the narrow valley traversed in furious haste by the Rhone itself. All to the west of the Ain, that is, to the west of the Jura, is a fertile alluvial plain forming the old province of Burgundy.

10. *The Geology of France.*

A great plateau of granitic and gneissose rocks, skirted by crystalline schists, occupies the centre of France. Rocks of similar character also crop up in the north-western departments, the greater part of the peninsula of Brittany being formed of granitic and schistose formations. Southwards from Morbihan the same rocks are continued into La Vendée, where they constitute the heights of the Vendéan Bocage. On the eastern side of France granites again come to the surface and form the heart of the Vosges Mountains. The peculiar dome-shaped *ballons* of the Vosges are mostly granitic bosses. With these granites are gneissose rocks and crystalline schists, the former being notable for containing in many places intercalated masses of saccharoidal limestone. In the Alpine districts of the south-eastern departments old crystalline rocks are also to be found—especially in the massives of Mont Blanc and of the Oisans; while farther to the west, in the department of the Var, similar rocks form the hills of Les Maures and L'Estrelle.

The lower Palæozoic strata—comprising the Cambrian and Silurian series—occur principally in Brittany and Normandy. From near Alençon on the east they stretch to the neighbourhood of Brest on the west; while in a north and south direction they extend from Cherbourg to Angers. At Angers the Cambrian slates are worked for roofing purposes. One of the best known localities for Silurian fossils is Néhou (Manche). Devonian rocks

form a fringe round part of the Silurian area, and they occur also in the Pas-de-Calais and on the north-eastern frontier, whence they extend into Belgium. Some of the Pyrenean marbles are clearly of Devonian age.

Unfortunately for France the Carboniferous formation is not extensively developed. The Carboniferous limestone is found only in small patches around the central plateau and in the neighbourhood of the Palæozoic area of Brittany. Its presence beneath the Wealden rocks of northern France has been proved by boring; and a small patch of the limestone, in nearly vertical beds, crops up in the Boulonnais. The principal coalfields will be noticed in the next section of this chapter.

In the neighbourhood of the Vosges is a fine development of the red sandstone known as the *Grès des Vosges*, believed to be of Permian age. Strata referred to the Trias are found in the departments of Calvados and La Manche, on the flanks of the Ardennes, near the granite of the Côte d'Or, in Provence, and in the Pyrenean region. The Triassic beds consist of *Grès bigarré* (Bunter), and of *marnes irisées* (Keuper), separated by an equivalent of the German *Muschelkalk*.

The Jurassic strata—including the Lias and the Oolites—are very largely developed. Not only do they occur in the Jura, whence they took their name, but they are found in the Alpine districts of the south-eastern departments, on the flanks of the Pyrenees, round the skirts of the Palæozoic districts of the north-west, and in the Bas Boulonnais. They also form a broad zone stretching across France in a double curve; from the Ardennes to La Rochelle they trend in a direction from N.E. to S.W., and thence turning south-eastwards they pass from La Rochelle to Montpellier. In many parts of their course the Oolitic rocks are quarried for building purposes. The famous Caen stone of Normandy—so

largely used by mediæval architects even in this country —is obtained from beds equivalent to our Bath Oolite.

Cretaceous strata follow for the most part the outcrop of the Jurassic rocks. They form the greater portion of Normandy and Picardy; they are largely developed in the basin of the Loire, or of Touraine; and they are exposed on the northern slopes of the Pyrenees. In the south of France the chalk forms a hard limestone, rich in the peculiar molluscs known as *Hippurites* or *Rudistes*. On the contrary, the chalk of northern France is a soft earthy limestone, resembling in physical characters, as also in its fossils, the ordinary type of English chalk: indeed, the upper Cretaceous rocks of England, Belgium, and northern France appear to have been deposited in a marine area, cut off from the Cretaceous seas of southern Europe, and known as the Anglo-Parisian basin.

Eocene rocks cover the Cretaceous strata to a very large extent. They are extensively developed in northern France, occupying the greater part of the basins of the Seine and the Loire, and they are also largely represented in the basin of the Garonne, stretching indeed over all the south-western part of France. The Sables de Bracheux of the Paris basin are equivalent to our Thanet Sands; but it is notable that no representative of the London clay is found in the Parisian area.

The post-Tertiary deposits, known as "diluvium," compose a large part of the soil of France. They occur along the north-eastern shores from Dunkirk to Calais, they are found in the Landes in the south-west, and they occupy many of the river valleys throughout the country.

11. *The Minerals of France.*

In the north of France a great deal of *coal* has of late years been obtained from the western part of the great

Franco-Belgian coalfield, which stretches as a long and narrow trough from Aix-la-Chapelle to Calais, a distance of more than 200 miles. The carboniferous strata in the north-eastern departments are in part concealed beneath newer strata. A patch of coal at Hardinghen, near Boulogne, has been cut off as a distinct basin by means of a fault which brings the Devonian rocks to the surface near Marquise. Around the central plateau of crystalline rocks are several small and irregular coal basins—the most important being that of St. Etienne and Rive de Gier, to the south of Lyons. Another field, in the department of Saône-et-Loire, yields thick beds of coal in the neighbourhood of Creuzot. Still farther to the south is the coalfield of Alais, in the departments of Ardèche and Gard.

Anthracite occurs on the flanks of the Alps, and has been worked in the department of Isère. *Lignite*, or brown coal, is an object of exploitation in the neighbourhood of Marseilles, and near Dax in the Pyrenees.

Of *iron ores* the most important deposits are those of brown hæmatite worked in Oolitic rocks, principally in the department of Meurthe-et-Moselle.

The other metallic minerals of France are not of great importance. *Lead ores* occur at Pontgibaud, in the Puy-de-Dôme, where a fine argentiferous galena is worked. *Tin ore* occurs in Brittany, a country of which the geological structure resembles that of Cornwall. *Copper* was formerly worked at Chessy, near Lyons, where the ores occurred at the junction of Triassic and Liassic strata with mica-schists. The mines were notable for yielding fine crystals of blue carbonate of copper, which was termed *Chessylite*, from its occurrence at this locality.[1]

Gold is found in many of the streams flowing from

[1] For a recent description of the principal mineral deposits of Europe, see Mr. J. A. Phillips's "*Ore Deposits*," 1884.

the Alps, the Pyrenees, and the Cevennes. The richest auriferous sands appear to be those of the Rhone, and for a long period the washing of these deposits formed a recognised branch of industry. At La Gardette (Isère) an actual vein of gold quartz has been worked.

Important deposits of *phosphate of lime* have of late years been opened up in the south of France, principally in the departments of the Lot, Aveyron, and Tarn-et-Garonne. *Clays* of fine quality are supplied to the porcelain factory of Sèvres from St. Yrieux, near Limoges, where the decomposing granite yields a pure kaolin. The French *burr-stones*, largely used as mill-stones, are siliceous rocks with a cavernous texture, found principally at La Ferté-sous-Jouarre.

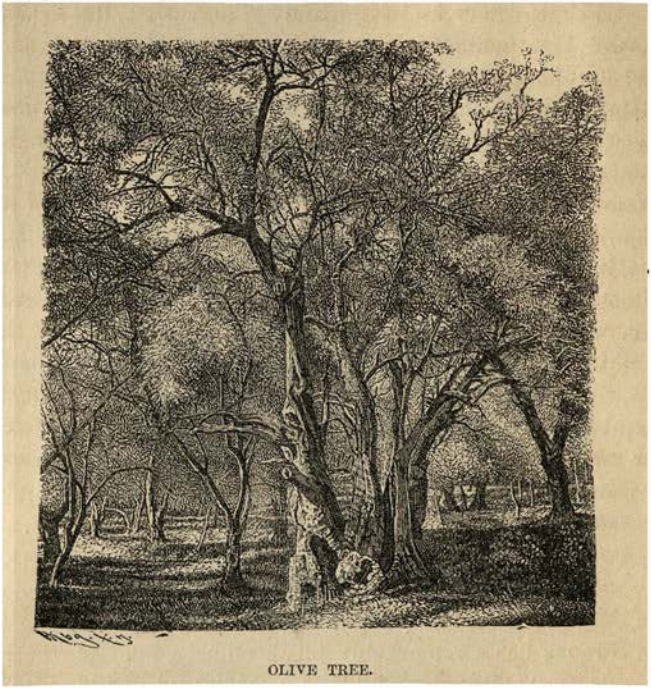
Salt is produced on a large scale, partly from the mines of Dax in the Pyrenees, but principally from the salt-pans round the coast. *Mineral* and *thermal springs* abound in Auvergne, in the Pyrenees, in the Alps, and in the Vosges.

12. *Climate, Flora, and Fauna.*

The chief differences between the climate of France and that of Britain consist in the higher temperature due to its lower latitude, and the less degree of humidity, owing to the generally level character of the west. The average annual rainfall of the whole country is computed at 30·3 inches. On its seaboard France shares in the benefit of the equalising effect on temperature of the ocean with its warm currents and warm winds; but as we go eastwards we discover on a small scale the same phenomenon as is met with in Europe generally, an increase in the extremes of heat and cold in summer and winter. At Brest in Brittany the mean temperature of summer is 62·2° Fahr., that of winter 44·8°, showing a difference of

17·4°, while at Nancy, in nearly the same latitude on the eastern frontier, the summer temperature is 65·1°, the winter 35·2°, showing a difference of nearly 30°. The winter of Brittany and Normandy is actually milder than that of Montpellier near the shores of the Mediterranean, and in consequence of those mild winters many exotic plants flourish in the open air in Brittany which do not succeed elsewhere at so high a latitude. Camellias are grown in the open air throughout Brittany, and several varieties of bamboo from Japan and China are grown in the botanic gardens at Brest, where also the *Yucca gloriosa* attains in the open air a height of 10 feet. A striking illustration of the difference of climate between west and east is furnished by the distribution of the cultivation of the vine. For its successful growth the vine demands a warm summer, though it can stand a tolerably severe winter, and this requisite degree of summer heat it finds in the south-west, in the valley of the Garonne, as well as in the south-east on certain parts of the Mediterranean, but in the north of the country only on the eastern side, namely, in the district watered by the Saône and Doubs (Burgundy), and in the departments of Marne and Aube (Champagne). The central plateau of France has a remarkably bleak climate, cold northerly winds prevailing here all the year round, and as this is combined with a sterile soil, the aspect of vegetation is less inviting here, than in any other part of the country. An account of the mistral or cold wind of Provence has already been given in the general Introduction, but we must here note more particularly the very remarkable effect it has upon vegetation. In the narrow valley-bottom of Donzère, between Montélimart and Orange, where its influence begins to be felt, we see a sudden transition from the vegetation of northern Europe to that of the Mediterranean region. It is here

that the cultivation of the olive begins, and in the small triangle between Orange, Nice, and Perpignan there grow as many as 600 plants which are met with nowhere else in



OLIVE TREE.

France.[1] This sudden change in the aspect of the vegetation is without doubt due to the dry air and bright sunshine which the mistral, so much dreaded and disliked for its violence and its cold, nevertheless brings with it. On the mean temperature of the air the mistral must, however, exert a lowering influence, for in this part of France we do not meet with the same increase in the summer temperature from west to east as we do farther north. Bordeaux, at the head of the Gironde, has the same

[1] Grisebach, *Vegetation der Erde*, i. 250.

summer temperature (71° Fahr.) as Orange, in nearly the same latitude, at the head of the triangle just mentioned.

France produces magnificent wines, corn, fruits, and cattle. Its flora, combining that of central Europe and the Mediterranean, is exceptionally rich. The country is usually divided into a corn-zone in the north, a maize-zone in the centre, and a chestnut- fig- and oil-zone in the south. The highland flora of the Alps and Pyrenees it shares with the other Alpine lands. Its fauna agrees on the whole with that of central and southern Europe, the only difference being that more cattle and sheep are found in the north of France, whilst the stock of horses is scarcely equal to its requirements. The wolf and the wild boar have not yet been extirpated (indeed the wolf is, for hunting purposes, partly preserved in Brittany); and in the south bees producing the famous Narbonne honey, and still more the silkworm, are extensively reared. The sea yields fish in great abundance, including the tunny, herring, and sardines.

13. *The Strait of Dover and the projected Tunnel.*

The continental section of western Europe is severed from the British Isles by the English Channel, or La Manche, which at its narrowest point, the Strait of Dover, is no more than 22 miles wide. The greatest depth of the strait is less than 180 feet. It is not surprising, considering its narrowness and shallowness, that schemes should have been proposed to span the strait by means of a bridge or to drive a tunnel beneath its bed. The late M. Thomé de Gamond, a French engineer, proposed a few years ago to tunnel from Folkestone to Cape Grisnez, passing under the shoal in mid-channel called "The

Varne," where a ventilating shaft could be readily sunk. On the Folkestone side the tunnel would start from the Lower Greensand, or beds immediately below the Gault; somewhere between the Kentish coast and the Varne it would probably pierce the Wealden rocks; it would then enter the Portland series, or Upper Oolites, and would continue in the underlying Kimeridge beds to the French coast, where the cliffs consist of Portland rocks resting on Kimeridge clay. It is obvious that by passing in this way through strata of varying physical characters much water might be encountered, for the porous beds would be charged to a greater or less extent with water, which would be tapped by the tunnel. Indeed, Thomé de Gamond's scheme presented such formidable engineering difficulties that it was ultimately abandoned.

The other schemes which have lately been prominently before the public propose to avoid these difficulties by passing wholly through the chalk. This thick limestone appears to pass evenly across the bed of the Channel, and the tunnel might be driven from end to end through practically the same rock. The scheme of the Channel Tunnel Company, with which Sir John Hawkshaw's name has so long been associated, would commence the tunnel at Dover, passing beneath the shore-line to Fan Hole, about 2 miles to the north, and thence striking out under the sea until the French coast was reached near Sangatte. The sea-tunnel would thus have a length of about $20\frac{3}{4}$ miles, measured from low water to low water, and this would be practically the shortest possible line. A geological survey, specially undertaken for Sir J. Hawkshaw in 1865, showed the identity of the strata on the opposite coasts, and a marine survey shortly afterwards determined the continuity of the upper Cretaceous beds across the bed of the Channel. To test the thickness

of the lower chalk, borings were executed at St. Margaret's Bay, 4 miles east of Dover, and at Ferme Mouron, 2½ miles west of Calais. It is believed that the tunnel might be carried from end to end through this chalk. It is a rock not so permeable as the upper chalk; and though it might be charged with water, it is believed that it would not discharge this water into the tunnel to any great extent except through fissures.

A rival scheme has been proposed by the South-Eastern Railway Company, and in 1880 experimental works were actively commenced. Shafts were sunk between Folkestone and Dover—one in the neighbourhood of Abbot's Cliff, another near Shakespeare's Cliff,—and headings were driven in the chalk marl, or lower part of the gray chalk. This rock, being more clayey than the beds above it, is less permeable to water; and it is believed that by driving the tunnel wholly in the chalk marl the difficulties arising from an influx of water would be greatly diminished, if not altogether avoided. These lower beds of the gray chalk are also less fissured than the overlying rocks. On the other hand, a tunnel which should start, as proposed, from a point between Folkestone and Abbot's Cliff, passing beneath the shore-line near Shakespeare's Cliff, and reaching the French coast near Sangatte, would be considerably longer than that following the route previously described.

Among other suggestions for the formation of a tunnel may be mentioned that of Professor Prestwich, who proposed to carry the shafts down to such a depth as to reach the Palæozoic rocks on each side, and to drive the tunnel entirely through these old strata.

Considerations of political and military expediency have not favoured the prosecution of the Channel Tunnel schemes; but so far as the geological structure of the ground under the Strait of Dover is concerned, there can

be no question that the formation of a submarine tunnel is perfectly practicable to the engineer.[1]

[1] On the geological possibility of a Channel Tunnel, see a paper "On the Geological Conditions affecting the construction of a Tunnel between France and England," by Professor Prestwich, F.R.S., *Proc. Inst. Civil Eng.*, vol. xxxvii. p. 110, 1874; "On the Geology of the Straits of Dover," by W. Topley, F.G.S., *Quarterly Journal of Science*, 1872; "The Channel Tunnel," by W. Topley, F.G.S., *Pop. Sc. Rev.*, vol. xiii. p. 394, 1874; "The Channel Tunnel," by J. Clarke Hawkshaw, M.A., *British Association Report*, 1883 (Southampton Meeting, 1882), p. 404; "On the Geology of the Channel Tunnel," by Prof. W. Boyd Dawkins, M.A., F.R.S., *Ibid.*, p. 542; "On the Proposed Channel Tunnels in their Geological Aspects," by C. E. de Rance, F.G.S., *Ibid.*, p. 544; and "On the Synclinal Structure of the Straits of Dover," by W. Topley, F.G.S., *Ibid.*, p. 546.

CHAPTER III.

GERMANY, THE NETHERLANDS, AND DENMARK.

1. *Situation and General Relief of the Land.*

GERMANY is composed of a number of states in the middle of Europe, stretching through about 17 degrees of latitude and $8\frac{1}{2}$ of longitude. On the north it borders on the sea, except at its junction with Denmark; on the south and south-east it is separated for the most part by pretty well-marked physical features from Switzerland and Austria, as also, in part, on the south-west from France; but both on the east and on the west the frontiers have been determined almost solely by political events.

The surface of the whole region now under consideration may be described in the most general terms as elevated in the south, while in the north and east it presents the aspect of a vast and almost uninterrupted plain. The elevated region is made up of hills, mountains, and tablelands, with intervening valleys of greater or less extent. The range farthest to the north is the Harz, nearly in the middle of the empire, near lat. 52° N., or about the same latitude as that of London. From this range the boundary of the elevated region runs south-westwards to the south of Belgium, and south-eastwards to the frontier between Silesia and Bohemia. In the region of the plain the principal elevation is formed by the Teutoburger Wald in the west. The more detailed description of the relief of the land may be fitly commenced in the south-west.

2. *The South-west of Germany—The Vosges—The Hunsrück and Eifel—The Black Forest—The Swabian Tableland.*

The Vosges form a mountain chain stretching for a distance of 175 miles in a north-easterly direction, from Belfort to the junction of the Nahe with the Rhine at Mainz. The whole stands out clearly from the surrounding land, although varying in height and physical aspect to such an extent that two distinct groups may be detected. The mass of the Upper Vosges, where crystalline rocks prevail, presents rounded crests of considerable altitude, the highest of which is the Great or Sulzer Belchen (*ballon*), 4700 feet, whereas the lower chain of the Vosges, farther north, consists exclusively of longitudinal sandstone plateaus. The Upper Vosges reach from the Ballon d'Alsace as far as the parallel of Strasburg, forming for the most part the boundary between France and Germany in this quarter, and on the German side they slope rather abruptly down to the valley of the Rhine, which is bounded on the other side by the Black Forest (Schwarzwald).

Compared with the climate of France—that is, of western Europe—that of the Vosges, which is covered in its upper parts with forests, seems extremely rigid, and more like that of Germany and the continent. In fact, we are here already in central Europe. The vine flourishes in favourable spots as high as 1300-1700 feet above the sea, wheat up to 1900, and potatoes up to 3800 feet.

North-west of the Vosges we still pass through a hilly or mountainous region, whence the Rhine, after turning westwards at Mayence, and north-west through a remarkable gorge at Bingen, receives on the left first the Nahe and then the Moselle. The range of hills lying

between these two rivers is known as the *Hunsrück*, which begins above Saarburg and advances close up to the Rhine, receiving in succession the local names of *Hochwald*, *Idarwald*, and *Soonwald*. Its highest point is the Erbeskopf, about 2500 feet in height. North of the Moselle, again, lies the old volcanic area of the *Eifel*, stretching westwards through Belgium to the Meuse, a region in which a tableland of Devonian slates is studded with extinct volcanoes of mid-Tertiary times.

Turning to the right bank of the Rhine, we find the Schwarzwald, or Black Forest, rising over against the Vosges, and presenting such a close correspondence to these in inner structure, as scarcely to leave any doubt that they originally formed one connected mass. The Schwarzwald, from Säckingen to the borders of Pforzheim, skirted west and south by the Rhine, extends north and south for a distance of 87 miles, with a breadth varying from 25 to 44 miles, everywhere almost imperceptibly merging in the Triassic plateau of northern Würtemberg, so that here it becomes very difficult to draw a hard-and-fast line between the two. It will, however, be best to draw it where the New Red Sandstone is supplanted by the Muschelkalk, for here ends the dark pine forest whence the range takes its name, and is again succeeded by extensive arable lands. The highest summits are in the south, where this highland region culminates in the Feldberg, 4904 feet, and where there are several other elevations exceeding 4000 feet in height. Many of these are famed alike for their glorious prospects and for the great variety of their alpine flora.

Still going eastwards, we come to where the Swabian and Franconian Jura, traversing Würtemberg and part of Bavaria in a south-west to north-east direction, form the north-western boundary of the *Swabo-Bavarian plateau*, which may be regarded as the gradual northerly slope of

the Alps, and hence as a continuation of the northern plateau of Switzerland. Its southern boundary in Germany is formed by the Noric Alps, separating Bavaria from Tyrol, and containing many peaks between 4000 and 8000 feet in height, while the culminating peak, the Zugspitze, rises to an elevation of 9750 feet. Its north-eastern boundary is formed by the *Böhmerwald*, on the frontier of Bohemia, where Mont Arber rises to the height of 4825 feet.

The plateau thus lying between the Alps and the Jura has an average height to the south of the Danube of about 1600 feet, and is furrowed by numerous streams flowing mostly parallel to each other from the Alps to the right bank of the Danube. Such are the Iller, the Lech with the Wertach, the Isar with the Ammer or Amber, the Inn with the Salza. The valleys, or rather the deep troughs, excavated by these streams, follow close on one another from west to east, the distance between them amounting to no more than a tenth, and often much less than a tenth, of their whole course. This rough, and in general little productive region, is mostly covered with extensive peat-bogs and morasses; and is further characterised by a series of lakes, such as Lakes Ammer, Würm or Starnberg, Simm, and Chiem. These lakes, all of them as monotonous as the landscape itself, are not to be confounded with a second and smaller series lying beyond them on the projecting spurs of the Alps, amongst which the loveliest are Lakes Tegern and Schlier. Those in the lowlands are easily distinguished by their greater size and by their form, mostly stretching in a northerly direction; while the farther we penetrate into the Alps the rounder become the lakes, as, for instance, Lakes Staffel, Kochel, and Walchen.

Corresponding to the southern or Alpine tributaries of the Danube are the numerous streams flowing from the

Jura southwards to its left bank. Such are the Lauter, Blau, and Brenz, from the Swabian Jura, the Woernitz and Altmuehl, bursting through the Franconian Jura in Bavaria, and the Nab and Regen, traversing the Upper Palatine plateau.

The outward aspect of the German Jura is no more attractive than is that of the Swiss and French. The Swabian Jura, or Swabian Alps, as they are also named, in Würtemberg, fully deserve the name of "rugged" (*rauhe*), by which they are called, consisting of a rocky limestone plateau from 15 to 30 miles broad, full of caverns, but with few streams, with leafy woods and pasturages, and flanked by a number of truncated cones. Its rude climate has earned the name of the Würtemberg Siberia for the district of Münsingen on the bare Swabian hills, which are here swept by bitter north winds. No more favourably circumstanced is the Franconian Jura with its steep sides sloping in a north-westerly direction towards the domain of the Neckar.

Following these slopes we are again taken westwards to the region lying north of the Black Forest. South and west of the Neckar valley this region is an undulating, cultivated, hilly district about 1650 feet above sea level, while to the north, between the Neckar and the Main, rises the pleasant *Odenwald*, with the Katzenbuckel (2322 feet), a densely-peopled district, with truncated cones and open dales, spreading from the north of the grand-duchy of Baden over all the south-eastern portion of the grand-duchy of Hesse.

On the right bank of the Main, between Lohr and Aschaffenburg, again rises a flat, many-coned frowning mountain mass, the Spessart or Spechtswald, culminating in the Geiersberg (2025 feet). It is covered by unbroken forests, so that wherever high and favourably situated spots afford a distant prospect over crests and cones and into

the deep-lying valleys, the eye, whichever way it turns, beholds literally nothing but sky and woodland. Renowned for their beeches, which here cover an enormous extent, and still more for their oak-trees, which tower in unparalleled magnificence, these forests always make a deep impression on the visitor, and all the more so, since one may wander about for hours together without anywhere seeing a hamlet or even a single house. In the valleys alone are to be found a few scattered settlements.

3. *Middle and Eastern Parts of the Highland Region.*

The Main being regarded by the Germans as forming the boundary between upper, or south, and lower, or north Germany, the district just described belongs to the latter, the highlands of which, forming middle Germany, embrace the whole area extending from the right bank of the Rhine, between Bingen and Cologne, eastwards through Westphalia, Hesse, and Thuringia, to Saxony. With the other ranges of middle Germany the *Spessart* is closely connected, being separated only by the valley of the Kinzig, a tributary of the Main, from the Vogelgebirge in Hesse on the north. This, again, is flanked on the south-west by the *Taunus* between the Main and Lahn, on the east by the *Rhöngebirge*, which in their turn are severed only by the lovely valley of the Werra from the *Thuringian* mountains. It is the Taunus whose western extremity (the *Niederwald*) forms the right bank of the Rhine at the gorge of Bingen already referred to; and here is the Rheingau, famous for its magnificent vintages. The whole range is remarkable for the superb forests on its gently-rounded cones, for the exuberant vegetation at its southern foot, and for its abundant mineral springs—Homburg, Wiesbaden, Schlangenbad, Schwalbach, Soden,

Selters, in some respects Ems also, besides Geilnau and Fachingen. Its highest point is the Great Feldberg, 2773 feet above the sea.

Parallel with the Lahn flows the Sieg, another affluent of the Rhine, and between them rises the *Westerwald*, whose north-western end, the so-called *Siebengebirge*, a number of volcanic cones grouped closely together, rises hard by the Rhine at Königswinter. Of the seven more prominent peaks, the most noteworthy are the Drachenfels (1066 feet) and the Oelberg (1520 feet). Still farther north, between the Sieg and the Ruhr, lies another hilly district, the *Sauerland* or *Süderland*.

The *Vogelgebirge* mentioned above as lying immediately to the north of the Spessart form the southern part of an undulating plateau, which in this quarter culminates in the Vogelsberg (2400 feet), said to be the largest mass of basalt in the world, and in the north is the broad grass-clad summit of the Meissner (about 2490 feet). Beech, maple, and pine woods, varied with open heaths and marshy meadows, cover these hilly districts, whose bleak climate and long winters have acquired for them the name of the "Hessian Siberia."

The rugged and generally cloud-capped *Rhöngebirge*, a swampy plateau, 2000 feet high, serves to connect the Vogelsberg with the *Thüringerwald*, or Thuringian Forest. The latter, beginning east of the Werra, consists of a narrow chain stretching for about 150 miles in a north-westerly direction, and separating the valley of the Elbe from that of the Werra and the Main. Its highest points are the Schneekopf (3200 feet), Ingelsberg (3150 feet), and the Beerberg (3225 feet), and the aspect of this well-wooded region, though pleasant, can scarcely be called grand.

The south-eastern section of the Thuringian Forest is called the *Frankenwald*, and attains a considerable

breadth, while its northern extremity is narrower and sinks in regular terraces towards the southern foot of the *Harz*. From the Thuringian Forest this celebrated mountain mass is, however, separated by the valley of the Unstrutt, and as on the north it overlooks the great northern plain, it stands quite isolated. It is partly to this conspicuous position that the Harz owes the celebrity which it enjoys out of all proportion to its extent and elevation. It consists of a series of parallel ridges with the same general direction as the Thuringian Forest and the Teutoburger Wald, namely, south-east to north-west, with a total length of about 50, and a breadth of about 16 miles. The highest summit is the Brocken or Blocksberg (3740 feet). The lower slopes are in general richly clad with forests, but the higher parts, which are frequently enveloped in mists, are just as remarkable for their bareness and the wildness of their features. From very early times the mountains have been famous for their mines, and the wild legendary tales of the Harz miners have likewise contributed greatly to give to these mountains their peculiar celebrity.

Passing eastwards from the Thuringian Forest we get into gently-undulating, and, for the most part, fertile country, with isolated hills and mountain groups here and there, until we come to the *Fichtelgebirge*, a curiously-isolated mountain range, partly in Saxony, but chiefly in the north-east of Bavaria. It is separated by depressions from the *Böhmerwald* on the south, the *Thüringerwald* on the north-west, and the *Erzgebirge* on the east, and is situated so centrally that it sends its waters to three great rivers, the Rhine, the Elbe, and the Danube, and hence to two widely separated seas. Its culminating summits are the Schneeberg and Ochsenkopf, respectively 3480 and 3378 feet in height. To the north-east of it lies the bleak plateau of *Voigtland*, mainly in the south-

west of Saxony. In the corresponding corner of eastern Saxony lies the hilly region of Upper Lusatia, which has several summits above 2000 feet in height, though none above 2500; and between these two there stretches on

ON THE BROCKEN.

the southern frontier of Saxony the chain of the Erzgebirge; but as these mountains, as well as the *Riesengebirge* on the Silesian frontier, belong more properly to Bohemia than Germany, we reserve our detailed description of them for the chapter on Austria.

The only other prominent features which remain to be mentioned as belonging to the German highland region are *Glatz* and the *Sudetic* ranges, running parallel to the Riesengebirge in the south-west of Prussian Silesia. Neither of them attains any great elevation, and the highest summit of the latter, the Altvater, is beyond the German frontier.

4. *The North German Lowlands.*

The North German lowlands form part of the great plain that stretches right across Europe from the coasts of Belgium and Holland.

Its general slope, as might be supposed from the direction of the river courses, is from the south-east towards the north-west. The great rivers watering this region, taking them in their order from west to east, are the Scheldt, the Meuse, here called the Maas, the Rhine, the Ems, the Weser, the Elbe, the Oder, and the Vistula. The four last named show a visible parallelism in their main course no less than in their principal bendings, and the same remarkable correspondence is observed in the flow of their tributaries.

As already mentioned at the opening of the chapter, the Teutoburger Wald, a narrow and perfectly straight sandstone ridge, running north-west and south-east, between the Weser and the Ems in the west of Hanover, is the only considerable elevation in this plain, but there are other hills dotting the same part of the plain like so many islands.

The coast of the west German lowlands on the North Sea is very low, and has in fact something of the same nature as that of Holland, of which it is a continuation, and the tendency shown by the rivers Ems, Weser, and Elbe to form wide estuaries in this part, a tendency which,

in the case of the Weser and Elbe, has converted the two inland towns of Bremen and Hamburg into real seaports, is characteristic. The background of this seaboard often consists of treeless plains, whose upper stretches are frequently capable of tillage, though in many cases nothing but sandy wastes overgrown with heath and heather, whereas the lower and wet lands consist of fertile marshy ground or extensive peat moors. In such moors the region of the Ems is especially rich. Marshy formations occur also along the west coasts of Sleswig and Holstein, while ranges of hills are but seldom met in the west German lowlands. The only lakes here formed are the little Dümmer See and Steinhuder Meer.

The total area of these moors, the natural vegetation of which consists almost exclusively of heaths in the drier parts, and of *Sphagnum acutifolium* in the bogs, is estimated at about 2340 square miles, two-thirds of which belong to the Prussian provinces of Hanover and Saxony, and the grand-duchy of Oldenburg, and the remainder to the adjoining part of the Netherlands (the Bourtang morass). Part of the area has been reclaimed for agriculture, principally in the Dutch portion, where the first works were begun more than two hundred years ago, and where the best system of reclamation is still pursued.[1]

A very different aspect is presented by the old Slavonic domain of the now Teutonised eastern lowlands, forming between the Elbe and the Vistula the background of the Baltic Sea. Here the coast is everywhere higher than west of the Elbe, and is protected from the waves either by dunes or by steep shores rising as high as 520 feet above the sea level. The Baltic, being moreover an inland sea, but slightly affected by the tidal movement, is in any case far less dangerous than the German Ocean.

[1] See *Ausland*, 1882, pp. 470, 483, 533.

In fact, in the east, instead of being encroached upon, we find the seaboard continually advancing. At times, however, this tendency of the seaboard to advance has been more than counter-balanced, not by the violence of the waves, but by the sinking of the land. The island of Rügen is known to have been at one time part of the mainland, and it was only in 1510 that the Frische Haff, behind the Gulf of Danzig, was formed by an inroad of the sea, due to the same cause. Not improbably the Kurische Haff at the mouth of the Memel or Niemen was originally formed in the same way; but the peculiar shape of these lagoons, characteristic of the German shores of the Baltic opposite the mouths of rivers, has another explanation. The peculiarity consists in the fact that shallow fresh-water basins are almost entirely cut off from the sea by low and narrow spits of land or chains of islands, called *Nehrungen*, which are connected at one extremity with some promontory of the mainland. It is to the existence of this promontory that the Nehrung probably owes its existence. Protecting the bay beyond from the sweep of a marine current, the promontory causes the sediment to be deposited on the margin of the stiller water within, or along the line on which the current of the river counteracts that of the sea.

The island of Rügen on the coast of Pomerania is the gem of the Baltic islands, abounding in bays and inlets, and with the varied succession of its woods and glades, hills and dales, rocks and moors, dunes and pasture lands, presenting a pleasant contrast to the dreary mainland close by.

Marshes and polders are unknown in the east German lowlands, which are on the other hand densely studded with bodies of still water. These countless lakes of all sizes are distributed principally over the plains of Holstein, Mecklenburg, Pomerania, and east

Prussia, and are most numerous in the two first-mentioned districts.

Throughout their entire length the eastern lowlands are traversed by two ranges of hills—the Uralo-Baltic and the Uralo-Carpathian, both coming from the Sarmatian lowlands in the east of Europe. The first forms the water-parting of numerous inland and coast streams, its sandstone hills forming a broad ridge clothed with pine forests, while it is further distinguished by the lakes of east Prussia and Pomerania just mentioned, as well as by the frequent presence of erratic blocks or boulders, memorials of the Great Ice Age.

The Danish peninsula of Jutland is merely a continuation of the north German plain, with no elevation exceeding 550 feet in height; and the Danish islands have much the same character, though in general they are more fertile. The north and west of the peninsula is almost entirely a bleak sandy heath, and the whole of the west coast is bordered by rows of dunes, known as *Klitten*, and is rendered almost uninhabitable by drift sand.

5. *The Netherlands.*

Under this term are included both Belgium and Holland, although, strictly speaking, the whole of Belgium does not belong to the Low Countries. Its south-eastern part, Namur, the southern part of Liège, and Luxemburg, together with the grand-duchy of Luxemburg, belong to the plateau of the Ardennes, and form a hilly country, with one or two elevations exceeding 2000 feet in height. The whole of Belgium may be conceived as gradually sloping from this hilly region in the south-east towards the lowlands forming the background of the North Sea, and embracing the lower reaches of the Scheldt, the Rhine, and the Maas (or Meuse), the whole

valley of the Ems, and the Lower Weser and Elbe. All this seaboard is in a constant state of formation and disintegration, owing to the ceaseless action of the tides. The islands running in a long chain from the northern extremity of the peninsula of Holland to Jutland are nothing but the remnants of a larger tract of land formerly connecting them with the continent, but which within historic times has been swallowed up by the Zuider Zee, the Dollart, the Jahde, and the Sleswig archipelago. Amongst the Dutch islands at the entrance to the Zuider Zee, Texel is at once the largest, and, thanks to its cheeses, the best known. The central group, off the German coast of east Friesland and Oldenburg, includes the much frequented watering-places of Norderney, Borkum, and Wangeroge, which are the most considerable of the "North Sea Islands." Lastly, on the Sleswig coast, is the North Frisian group; amongst them the solitary Sylt, thus described by Dr. Julius Rodenberg: "The easterly sea is calm and narrow. Over against us are the coasts of Jutland and north Sleswig; at low water it is half dry land, the *Watts*, or flat sandbanks, emerging and shimmering like silver dust in the sun, while the azure waters of the Wattenmeer coil round them like a many-folded blue ribbon. Small fishing-smacks sail to and fro, a wreath of smoke appears and then vanishes, as the steamer comes from Husum or Hoyer. Willow-trees with their bushy tufts mark their course; they are hid from view on either side of the watts, and in and out glides the flat-bottomed boat in the channels of the water. We never lose sight of the land; when the mainland disappears on our right there emerge on our left the Hallig Isles, broad-stretching sand-flats whose central elevation bears three or four huts, perhaps one or two cattle-sheds or barns, for the gentle slopes afford a rich pasture, and the Hallig peasants own the finest of cattle. In winter,

when the wind blows and the billows roll, they sit often for weary months alone in their Hallig homes; they see the mainland, but cannot get across, for then the boats are useless. Once or twice, when the tide is at its lowest, sturdy young fellows familiar with the dangerous paths venture to cross over, taking one ebb to go and returning with the next. These are the so-called '*Schlickläufer*' or 'runners on the mud,' whose varied fates give the only seasoning of adventure to the monotonous life of the Watt banks and the Hallig islanders."[1]

Between the North Frisian and the North Sea groups lies the British island of *Heligoland*, already half devoured by the sea, but still a famous watering-place, with a little town perched on a rugged cliff.

Of the inlets along the seaboard of the west German lowlands the most considerable and noteworthy is the Zuider Zee. It was formed in the thirteenth century, when the sea burst in, separating Friesland from the province of Holland, which thenceforth assumed a peninsular character. This province is almost detached from the mainland by the Ij (pronounced I), a narrow arm of the Zuider Zee running east and west, and serving as a haven for Amsterdam. The narrow neck of land connecting them (*Holland op zijn smalst*) has, however, been cut through by a canal affording direct access to Amsterdam, opened on November 1, 1877, so that merchant vessels can now reach the heart of the city in two hours from the German Ocean.[2]

The shores of the North Sea are all low and protected from the overflowing of the ocean only by the so-called dunes or sand-hills, stretching in a long line from Calais to the Skager Rack. These dunes, however, are often

[1] *Stilleben auf Sylt:* Berlin, 1876.

[2] F. C. Danvers, "The Port of Ymuiden," in the *Quarterly Journal of Science* for January 1877, pp. 41-47.

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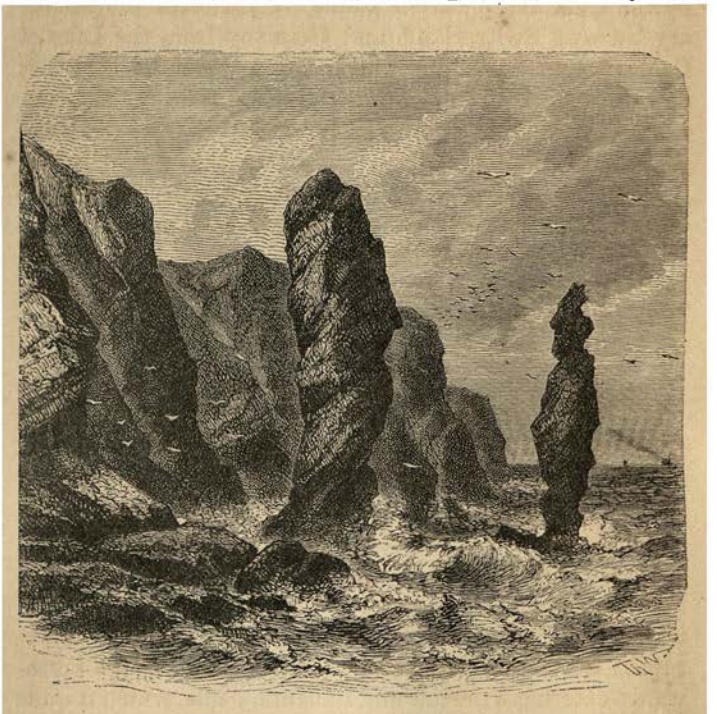
broken through, and are then replaced by artificial dams or dykes; muddy sandbanks (*watts*) and saline marshes being often thus reclaimed from the sea, and converted into the fertile meadow lands, or *polders*, as they are



ON THE COAST OF HELIGOLAND.

called in Holland. Thus was drained the Haarlem Meer, and thus also has the gigantic plan been formed again to expel the Zuider Zee, and by the arts of peace to conquer a twelfth province for the kingdom of the Netherlands.

6. *River Systems.*

By far the most important of the German rivers are the *Rhine* and the *Elbe.* The former, affectionately called by the Germans "Father Rhine," constitutes the boundary between Switzerland and Germany from the Lake of Constance to Basel, and during this part of its course it flows in a rocky bed skirting the Swiss Jura on the left, and separating it from the Franconian Jura (Swabian Alps) and the crystalline masses of the Black Forest. At Schaffhausen it forms the celebrated falls, at which it plunges over a rock 70 feet high, and lower down at Laufenburg and again at Höllenhacken rapids and cataracts occur through the narrowing of its bed. At Basel the river turns northwards, and as far as Mayence winds over a long flat plain, making numerous loops enclosing many islands. In this part of its course floods take place annually, and in consequence a considerable area on both sides was formerly marsh land; but since 1840 this evil has been greatly remedied by the construction of a navigation channel with high embankments, confining the stream to a bed 820 feet in width. At Mayence the river again turns westwards along the southern slopes of the Taunus, and at Bingen, where the navigation has been improved by the removal of rocks which formerly interrupted the course of the stream, it once more turns northwards, entering a narrow and romantic defile, which it quits at Bonn to wind over the great North German plain. It is navigable for steamers without interruption as high as Mannheim almost the whole year round, and possesses several navigable tributaries. For the further improvement of its navigation considerable sums were voted by the states on its banks in 1880. The Neckar and Main on the right bank of the Rhine traverse scenes not unlike those traversed by the main stream below Bingen, wind-

ing amongst bolder or softer vine-clad hills often crowned by ruined castles. The former is navigable for barges below Cannstadt, and the latter for the last 200 miles of its course, but only in winter. The Moselle (or Mosel, as it is called by the Germans) on the left bank becomes navigable at Pont-à-Mousson in the French department of Meurthe, but is really of little use for navigation on account of its extremely tortuous course.

By means of canals the basin of the Rhine is connected with the basins of the Rhone and Saône, Scheldt, Meuse, and Danube. The Ludwig's Canal, which effects the last-mentioned communication, must now be said to be of more historical interest than commercial importance. From very early times it was an object of desire to have these two great basins connected by water. The remains of works begun with this aim, and attributed to Charlemagne, can still be seen, but it was only in the present century that the canal was actually made. This canal follows the main valley of the Regnitz, a tributary of the Main, crosses the water-parting at Neumarkt at the height of 1443 feet above sea level, and debouches into the Altmühl, a tributary of the Danube. But now that it has been made, it has been to a large extent superseded by railways, and its traffic is stated to be decreasing every year. The Danube itself, which has its origin in two mountain streams rising in the Black Forest at the height of 2850 feet above sea level, becomes navigable at Ulm for vessels of 100 tons, and at Regensburg (Ratisbon) for steamers.

The Elbe, which rises in Bohemia, becomes navigable on crossing the German frontier, and is even of more consequence than the Rhine as a commercial highway. Hamburg, at the head of its estuary, is by far the most important of the German ports. A considerable contingent to the traffic of the Elbe is furnished by the system

of canals and navigable rivers connected with the Havel and Spree on its right bank—a system communicating with Berlin. The scenery on the banks of the Elbe is nowhere very interesting, except in the part above Dresden where it and its numerous tributaries cut through the so-called "Saxon Switzerland," in which the sandstone rocks have been weathered into highly remarkable and often fantastic, but very characteristic, forms.

Of the other rivers that wind in a more or less north-westerly direction over the German plains the *Vistula* affords the greatest facilities for navigation. It is already navigable for large vessels when it crosses the German frontier. It flows, however, through a marshy region, now partly drained. Its delta, extending over an area of upwards of 600 square miles, was formerly one great swamp, but has been converted into a fertile tract by the construction of embankments begun by the Teutonic knights in the thirteenth century. The *Oder* is a shallow and rapid stream on which large sums of money have been spent in endeavours to convert it into a navigable channel. This expenditure has at last proved, to a large extent, satisfactory. Works have now been going on for some years with the view of securing a depth of at least 1 mètre (3 feet 3 inches) throughout the whole course between Ratibor, near the frontier of Silesia, and Schwedt, almost exactly 400 miles lower down, and these works are now for the most part completed. Engineering works have also been necessary to get cultivable land out of marshes. The tract on the left bank known as the Oderbruch, between Podelzig, near Frankfurt, and Oderberg, now an extremely fertile district, was an inaccessible swamp till Frederick II. caused a channel to be dug to drain it. The chief service rendered to navigation by the *Weser* consists in having at its mouth the port of Bremen. The upper part of this stream tra-

verses a hilly or even mountainous district, and it only emerges on the plain at Minden, where it has made a breach for itself through a range of hills running from south-east to north-west parallel to the Teutoburger Wald —a breach that has always been a point of great strategic importance.

It is worthy of note that all the great rivers of the German plain make an abrupt turn to the north about the middle of their course—the Weser, Elbe, and Oder about lat. 52° N., and the Vistula about lat. 53°; and it has been surmised that this sudden change of direction is due to a sinking of the German plain towards the Baltic Sea. In the case of the Elbe and Oder it is known that they once pursued a course below these bends different from that which they now follow—a course which carried their waters farther to the west. The latter once flowed through the Havel lakes into the valley now occupied by the lower Elbe, emptying itself into the North Sea, while the Elbe itself continued its course in the present bed of the Aller and Weser.

The rivers entering Holland from the south-east, such as the Rhine and Maas (Meuse), are even a greater source of anxiety and danger to the inhabitants of this low country than the sea. They are constantly filling their beds with sediment, and thus rising higher and higher, and ever threatening to overwhelm the land. In spring, at the melting of the snows, and again in autumn at the time of the heaviest rains, they are specially dangerous; but, in fact, the danger exists at all seasons. In order to remove the risk of inundation by the Lower Vaal and Maas a scheme has received the sanction of the Dutch Legislature for diverting the latter river at Heusden, before it joins the Vaal, into a new channel, which would take its waters separately to the Hollandsch Diep, and thus relieve the present joint bed of the lower stream.

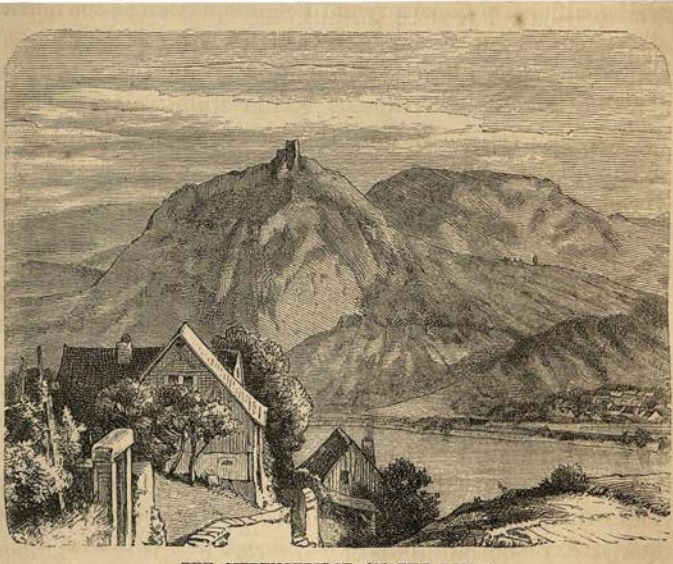
The largest of the lakes of Germany is the *Bodensee*, or *Lake of Constance*, which is partly Swiss (see SWITZERLAND). As previously stated, the whole of the north of the plain bordering on the Baltic is studded with numerous lakes, but these are mostly very small. Although counted by the hundred their total area is only between 600 and 700 square miles. The largest (*Müritz* and *Schwerin*) are in Mecklenburg. The Bavarian lakes have already been referred to (p. 90).

7. *Geology.*

Nothing can be simpler than the geological structure of the greater part of the extensive plain forming north Germany, Denmark, and most of the Netherlands; while that of the southern mountainous region is as complicated as are its orographical features. The plain is for the most part covered with quaternary deposits of glacial date, and the numerous patches of older strata that are exposed all over the surface belong mainly to the Miocene epoch. Of still earlier age, there are several patches belonging to the Upper Jura (known to the Germans as Dogger and Malm) between Kolberg and Swinemünde and the Baltic, and still more extensive areas of Upper Cretaceous deposits. The latter occupy the greater part of the island of Seeland opposite the rocks of corresponding age in the south of Sweden, and likewise a considerable extent of the peninsula of Jutland, between the Kattegat and the Liimfiord. Smaller outliers of the same rocks lie scattered over the lake district of Mecklenburg, and we again meet with larger deposits of the same nature on and near the southern border of the quaternary area.

In order to understand the main geological features of the highland region, it is desirable to begin with the part intersected by the Rhine between Bingen and Bonn.

There we have, it is true, not the oldest of the sedimentary rocks of Germany, but by far the most extensively developed of the Palæozoic strata in the area now under consideration. These strata, which are of Devonian age, stretch far away eastwards and westwards, covering, in the latter direction, the south-east of Belgium and a portion of the north-east of France. Scattered over it are numerous patches of trachytes and basalts (in the Eifelge-



THE SIEBENGEBIRGE ON THE RHINE.

birge, the Westerwald, etc.); while the Vogelsberg, which is almost contiguous with part of its eastern boundary, is made up of similar eruptive rocks. Some of the best known eruptive rocks on the Rhine are those which constitute the group of the Siebengebirge, or "Seven Mountains," at the N.W. end of the Westerwald, opposite Bonn. The picturesque mass of the Drachenfels, rising to 1066 feet, consists of trachyte, and a quarry on its side fur-

nished the stone used in the construction of Cologne Cathedral. In the western section of the Devonian area the heights known as the Hohe Veen, on the borders of the Rhine province and the Belgian province of Liège, are mainly of Silurian age, and accordingly belong to the oldest sedimentary rocks represented in Germany. The Carboniferous strata occur at different localities on the borders of these Devonian rocks, and among these we have most of the great coalfields of Germany and Belgium, as well as the north of France. Thus on the borders of the east section are the coalfields of the Lahn valley, and on the northern boundary the still richer coalfields of the Ruhr valley; while on the borders of the western section are those of the upper Meuse (Namur and Liège), with an outlier at Mons; and on the south those of the Saar valley. In this last locality the Carboniferous rocks enclose a considerable tract occupied by quartz-porphyry, melaphyres, and other eruptive rocks, which are interesting on account of the large number of agates found in amygdaloidal cavities in the mother-rock, especially in the district round Oberstein on the Nahe. North of the Ruhr coalfields there are no strata between the Carboniferous and the Upper Cretaceous: the latter is here exposed amidst the quaternary drift in considerable patches, while in Belgium the rocks that succeed the Carboniferous to the south of the quaternary area are mainly of Eocene and Miocene age.

Looking next at the area intersected by the middle Rhine between Basel and Bingen, we find that in that part of the Rhine valley lies the dividing line between two great basins, in each of which is the same succession of strata, beginning with the oldest. In the south there are on opposite sides the gneissic and granitic masses of the Schwarzwald and the Upper Vosges, with Devonian and Permian rocks occurring amongst the latter; but farther north we see distinctly the series of strata referred to. A

line passing east and west through Heidelberg will traverse in succession, on both sides of the Rhine valley, all the three members of the Trias,—Bunter, Muschelkalk, and Keuper,—and the middle one (absent in England) is specially well developed on the east side. On both sides the Triassic series is followed by that of the Jura, the position of which is pretty well marked on the east by the Swabian Alps and the Franconian Jura, while on the west it begins not far from the frontiers of France, near Nancy, Metz, Luxemburg, and Sedan. On the west side the series is continued in France through the Cretaceous system to the Eocene and Miocene; but on the east the Cretaceous rocks are wanting, and the Jurassic deposits are immediately followed by those of Miocene age, forming a continuation of the Swiss plateau. Their boundary on the north is approximately indicated by the course of the Danube to within the Austrian frontier, while on the south they are limited by the zone of Eocene and Jurassic rocks, which stretch along the northern flanks of the Alps, from the Lake of Constance to Vienna. In Germany, however, these Miocene deposits, occurring within the area just indicated, are to a large extent overlaid by quaternary drift.

The whole of the eastern basin now under consideration is bounded on the east by the gneissic and crystalline rocks which make up so large a part of Bohemia and Moravia, and to which belong the Böhmerwald, Fichtelgebirge, Erzgebirge, Riesengebirge, and Sudetes. The chief areas of the post-Triassic rocks belonging to it are those already indicated in the east and south-east; but the members of the Triassic series extend northwards with varied interruptions to about 52° 20′ N., where they are succeeded by a few small patches of the younger series of the rocks belonging to the basin between the Teutoburger Wald and the Elbe. The Teutoburger Wald itself is

formed mainly of Jurassic rocks. Among the interruptions that occur in the northern development of these Triassic rocks the most important are the Thüringer Wald, composed chiefly of eruptive and Permian rocks, and connected by the Devonian and Silurian strata of the Frankenwald, with the crystalline rocks of Bohemia; and, secondly, the isolated Devonian, Carboniferous, and Permian formations, which, together with crystalline rocks, make up the Harz Mountains.

Returning once more to the valley of the Rhine itself between Basel and Bingen, we observe the correspondence between the rocks—both eruptive and sedimentary—on the two sides of the valley, and the idea naturally suggests itself that the separation of the equivalent strata must have been wholly the work of the river. But a closer examination of the geological structure of the region belies this suggestion. The valley certainly existed previously to Miocene times, and then became filled with deposits which were undoubtedly once continuous with those of the Swiss plateau, and have left isolated remains in various hollows of the Jurassic mountains now intervening. But previous to that time the river Rhine did not exist. The local evidence shows that the streams flowing in this valley when the Miocene deposits first became dry land must have had a southerly course, and the Rhine took its origin only after the last movements of upheaval in Switzerland gave this valley its gentle tilt to the north; and since then the Rhine must have hollowed out both the relatively broad valley between Basel and Bingen —winding about and shifting its course from age to age over the Miocene plain at its bottom—and also the picturesque gorge in the Devonian rocks, which it enters at the latter town.[1] Since this period the bottom of the

[1] See Ramsay, "Physical History of the Rhine," in *Proc. of Royal Inst. of Great Britain*, vol. vii. p. 279.

Rhine valley between Basel and Bingen has become mainly covered with quaternary deposits, the nature of which was considered in the Introduction.

Among the extinct volcanoes of Germany, the most interesting are those of the Eifelgebirge among the Devonian rocks west of the Rhine. The cones enclosing some of the crater lakes, or *Maare*, of the Eifel, consist not so much of eruptive rocks as of fragments of the Devonian strata through which the volcanic matter has passed.

8. *Minerals.*

Among the mineral products of the region embraced by this chapter the most important are *coal*, *iron*, and *zinc*. In the production of the first two Germany and Belgium rank next after Britain among European states; and as producers of zinc they surpass all the rest of the world. The position of the western coalfields has been briefly indicated in the section on Geology. A long narrow trough of coal-measures, much contorted and broken up into several basins, stretches from the north of France through Belgium, and onwards into Prussia. In Belgium the most important centres are in the basin of Mons, where about 120 workable seams occur; in the basin of the Sambre, between Charleroi and Namur; and on the western edge of the Liège basin. A few small coalfields connect this Belgian trough with the great Westphalian basin between Essen and Dortmund in the valley of the Ruhr. This is continued still farther eastwards as far as Ibbenbüren and Osnabrück. One of the most important coalfields in western Europe is that of Saarbrück, where a thick series of valuable seams is worked. In Saxony there are two basins,—one in the Plauen'sche Grund, near Dresden; the other the coalfield of Zwickau, where much of the coal-producing area

is buried beneath newer rocks. Farther to the east lies the great coalfield of Upper Silesia. This, though not the most productive, is the most extensive of all, and, indeed, the largest in Europe. Its area where exposed at the surface is about 220 square miles, and there is altogether an area of about 500 square miles in which the coal is still accessible, though lying in part under younger rocks than those of the coal-measures. The working of this field was begun in 1784. There is also a coalfield in Lower Silesia.

Much more extensive than the beds of true coal in Germany are those of brown coal or lignite, which is a very important fuel in many parts of this area. The deposits of lignite in Germany form a western group on both sides of the Rhine, and an eastern group in the Prussian provinces of Saxony and Brandenburg. It is likewise found in the boulder clay of Denmark.

It is notable that coal of Wealden age is worked near Hanover, and that asphalt occurs in the neighbourhood.

Iron ores are most abundant in the coalfields of the Lahn and upper Silesia and the adjoining parts of Saxony, in Germany; and in the Belgian coalfield in Namur between the Sambre and the Meuse. Fine spathic ores (carbonate of iron) are found in veins in the Devonian rocks near Siegen, notably at Stahlberg; while red hæmatite occurs largely in Nassau and near Eibenstock in Saxony.

In Germany zinc is chiefly obtained in the mountains of upper Silesia, in the Schwarzwald and the Harz. In Belgium there is a famous deposit of calamine (carbonate of zinc) at Vieille Montagne, near Aix-la-Chapelle.

Of metallic products of less importance than iron and zinc the first place is due to *lead*, ores of which are found principally in the Prussian government of Aachen (Blei-

berg), as well as in other parts of western Prussia, in the Harz, and in the kingdom of Saxony round Freiberg. *Copper* ores are not very abundant. They are principally found in the districts of Mansfeld and Arnsberg. One of the most famous copper ores is the *Kupferschiefer*, a bituminous shale of Permian age, containing only a small proportion of copper, but worked on a large scale in the neighbourhood of Eisleben and Mansfeld in Prussian Saxony. This ore has been known and worked for several centuries. It was in mines of this copper slate that the father of Martin Luther was employed. In addition to these, *tin* is found in the Erzgebirge between Saxony and Bohemia; *silver* is obtained from the mines of Freiberg in Saxony, and of the Harz; *gold* was formerly washed from the sands of the Rhine; *bismuth* occurs in Saxony; *antimony* in Thuringia and the district of Arnsberg; and *nickel* and *cobalt* in Saxony.

But more important than all these minor metals are the enormous beds of *rock-salt* found in various parts of Germany. This mineral is, in fact, obtained in all the states of the Germanic empire except the kingdom of Saxony, but most abundantly in the Prussian province of Saxony. The great deposit at Stassfurt in this latter province has been known since 1837 and worked since 1852; but within the last twenty years various other deposits have been opened in other parts of the Prussian monarchy,—that of Sperenberg in Brandenburg in 1867, that of Segeberg in Schleswig-Holstein in 1868, those of Inowraclaw and Wapno in Posen in 1871 and 1872. In Hanover, Würtemberg, and the south-east of Bavaria (Berchtesgaden, Reichenhall, etc.), there are other important salt-works. The salt-works at Stassfurt and Leopoldshall are celebrated not only on account of their common salt, but also on account of the extraordinary quantities of potassium salts which they yield. These salts are used

in agriculture. Recently another large deposit of salts of the same nature has been discovered by borings near Lübtheen in Mecklenburg.

The only other minerals that need be mentioned are the *amber* obtained from the coasts of the Baltic, especially between Memel and Königsberg, the *phosphorite* of Nassau, and the *lithographic stones* of world-wide celebrity derived from the Solenhofen slates of the Oolites on the Altmühl in the Franconian Jura—slates of peculiar interest to the geologist from the fact of their having yielded a large harvest of beautifully-preserved fossil remains, including those of the oldest known bird, the *Archæopteryx*.

9. *Climate.*

In relation to its extent in latitude and longitude the temperature in Germany and the adjoining plains is remarkably uniform. The increase in elevation towards the south tends at the same time to reduce the temperature below that corresponding to the latitude, and to bring about the same extremes as we meet with in going from west to east. At Königsberg on the Baltic, in east Prussia, the mean temperature for January is 26° F., for July 63° F., for the whole year 44° F. At Bayreuth, on the Franconian plateau in Bavaria, the corresponding temperatures are 28°, 63°, and 45½° F. The principal difference is in the winter temperature of the west, the part exposed to the influence of the Atlantic currents, and the east. At Emden on the North Sea the mean January temperature is 36°, at Utrecht 34½°, at Münster in Westphalia 34°, while at none of these places does the July temperature exceed 65½°. With these may be compared Königsberg, Bromberg in Posen, and Breslau in Silesia, the January temperature of which is 26°, 27½°, and 28° respectively, while in none of them does the

July temperature exceed 65°. At Friedrichshafen, on the Lake of Constance, in the extreme south, the July temperature is only 66½°, and that of January 31°. The warmest parts of the country are in the sheltered part of the valley of the Rhine between the Vosges and the Black Forest, and in the valley of the Main, in both of which localities the almond and the chestnut mature their fruits. At Karlsruhe, in the former district, the mean January temperature is 33½°, that of July 68°, that of the whole year 51°.

The records of the rainfall at the different stations in Germany have been analysed by Dr. J. van Bebber.[1] As regards the period of the year at which the heaviest rains fall, he finds that three regions may be distinguished, although their boundaries are not very sharply marked off from one another. The most extensive region is that in which the summer rains predominate, embracing the whole of Germany, with the exception of the west coasts (including the Netherlands), under the influence of the Atlantic and the North Sea, and the high stations in Alsace. The predominance of summer rains is all the more marked the farther we advance from west to east and from north to south. The west coasts, like those of Norway, Britain, and France, have the highest rainfall in autumn, the highlands of Alsace in winter; there is a high autumn rainfall likewise on the eastern shores of the Baltic, and a high winter one in Lorraine and the Palatinate of the Rhine. In general the area in which the rainfall during a single season of three months exceeds 5 inches is smallest in winter and increases from spring to summer, declining again in autumn. In all the mountainous districts from the Riesengebirge westwards the rainfall is never under 10 inches during any of the

[1] See "*Die Vertheilung des Regens über Deutschland*" in Petermann's *Mittheilungen*, 1878.

four seasons of the year. Throughout the entire area of which we are speaking the rainfall declines on the whole from west to east and south-east, so that the Silesian plain lying in the "weather-shadow" of the Riesengebirge has the smallest rainfall in the whole of Germany, the total amount for the year being there generally under 23 inches, in some parts much lower. The Rhine valley between the Vosges and the Schwarzwald, as it is sheltered from cold by these highlands, so also is it sheltered from rain, and is accordingly always drier than the higher ground on either side. During the winter months its rainfall is under 5 inches from Basel to Strasburg, and thence north-westwards to Saarbrück. The Harz Mountains are notorious throughout Germany for their almost constant mists and rains, the reason of which is that they are the most isolated of all the high ranges of Germany with a direction from south-east to north-west, that is, at right angles to the course of the chief rain-bringing wind, the south-west. The rainfall on the summit of the Brocken amounts to about 66 inches in the year.

10. *Vegetation and Animal Life.*

It has already been stated[1] that the whole of Germany belongs to what Grisebach has designated the Northern Forest Region of the Eastern Continent, that is, of the Old World, and there is abundant evidence to show that forests are indeed the characteristic vegetation of central Europe. The extent of the forests has been enormously diminished within historical times; but in most parts of Germany it is still found that where a piece of ground is left to itself for a few years it gets covered, first with shrubs, and in the end with trees, especially conifers. Eight years have been known to suffice to cover a neglected

[1] See Introduction, p. 47.

piece of ground with a coppice in which the stems were as high as a man.[1] From documentary and other evidence it has been shown that as late as the close of the first millennium of the Christian era the whole of the south-east of Bavaria, together with the adjoining parts of the Austrian Alps, was occupied by an almost continuous expanse of forest, on which, however, advancing cultivation was then steadily making inroads.[2] Of the magnificent relic of the ancient forests in the opposite corner of Bavaria, the Spessart, and Spechtswald, some account has been given in a previous section. As might be expected, the forests are now mainly, but by no means wholly, confined to the mountains, all of which are still well wooded. The luxuriance of the woods, however, is greatly affected by secondary causes, among which the nature of the soil seems to take the chief place. An abundant rainfall is almost always necessary for the maintenance of great forests, but, as we have just seen, this is nowhere wanting among the highlands of Germany. But much depends upon whether the soil is of such a nature as to retain the moisture or to allow it to pass off rapidly, the finest forests being always found on soils of the first kind. It is to this cause that Ratzeburg ascribes the magnificence of the forests on the basalt rocks in the region of the Weser and on the trachytes of the Rhine.[3] The finest beech forests in Germany are found on the Baltic and on the calcareous soils of the chains of hills in the Weser district. Oak forests are rarer; but, besides that of the Spessart, there are well preserved forests of this kind, containing many magnificent trees, on the banks of the Elbe in Anhalt, and on the alluvial soil on the banks of the Oder in Silesia. Forests of Norway spruce adorn the Sudetes and the Harz, and the silver firs of the

[1] *Ausland*, 1882, p. 186. [2] *Ibid.*, pp. 208, 210.
[3] Grisebach, *Vegetation der Erde*, i. 158.

Black Forest include the noblest specimens of their kind to be found in Europe.

The influence of the sea climate on the vegetation of Germany is very marked, and all the more since the effect of latitude on climate is counteracted, as we have seen, by the rise in elevation towards the south. Hence we find that the limit of certain forms which cannot stand a severe winter is an easterly one. Perhaps the best illustrations of this fact are to be found in the gorse or whin and the holly, neither of which will grow at a greater distance than 100 miles from the coast. The former, though indigenous in the region round Osnabrück in western Hanover, dies out in eastern Hanover, for example, in the neighbourhood of Göttingen, where it was at one time tried for hedges; and the latter, though wide spread among the beech forests near the North Sea, steadily diminishes in size and finally disappears as we advance inland.[1]

The beech forests of Denmark, according to Sir Charles Lyell, are the most luxuriant in the world; and it is a curious fact that, as the remains in the peat-bogs show, they are the successors of oak forests which flourished in the Bronze period, and these again of forests of Scotch fir which occupied the peninsula during the Stone age.

Large as the area of Germany is, its flora contains not a single member peculiar to the region.[2] The continuity of the plains with those on the east and west, and the continuity of its mountains with those on the south, enable it to exchange its vegetable forms on all sides. Hence Germany appears to be a centre of vegetation for the whole of the north temperate parts of Europe, and it is for that reason that the term "Germanic flora" is often applied, as stated in Chapter I., to the characteristic flora of these regions.

[1] Grisebach, *Vegetation der Erde*, i. 97. [2] *Ibid.*, i. 212.

The forests of Germany are infested by badgers, wild cats, wild boars, martens, and other wild animals, including even wolves. These last, however, are now chiefly confined to the Ardennes, and the more noxious of the wild animals generally are in process of extermination.

CHAPTER IV.

SWITZERLAND.

1. *Relief of the Land.*

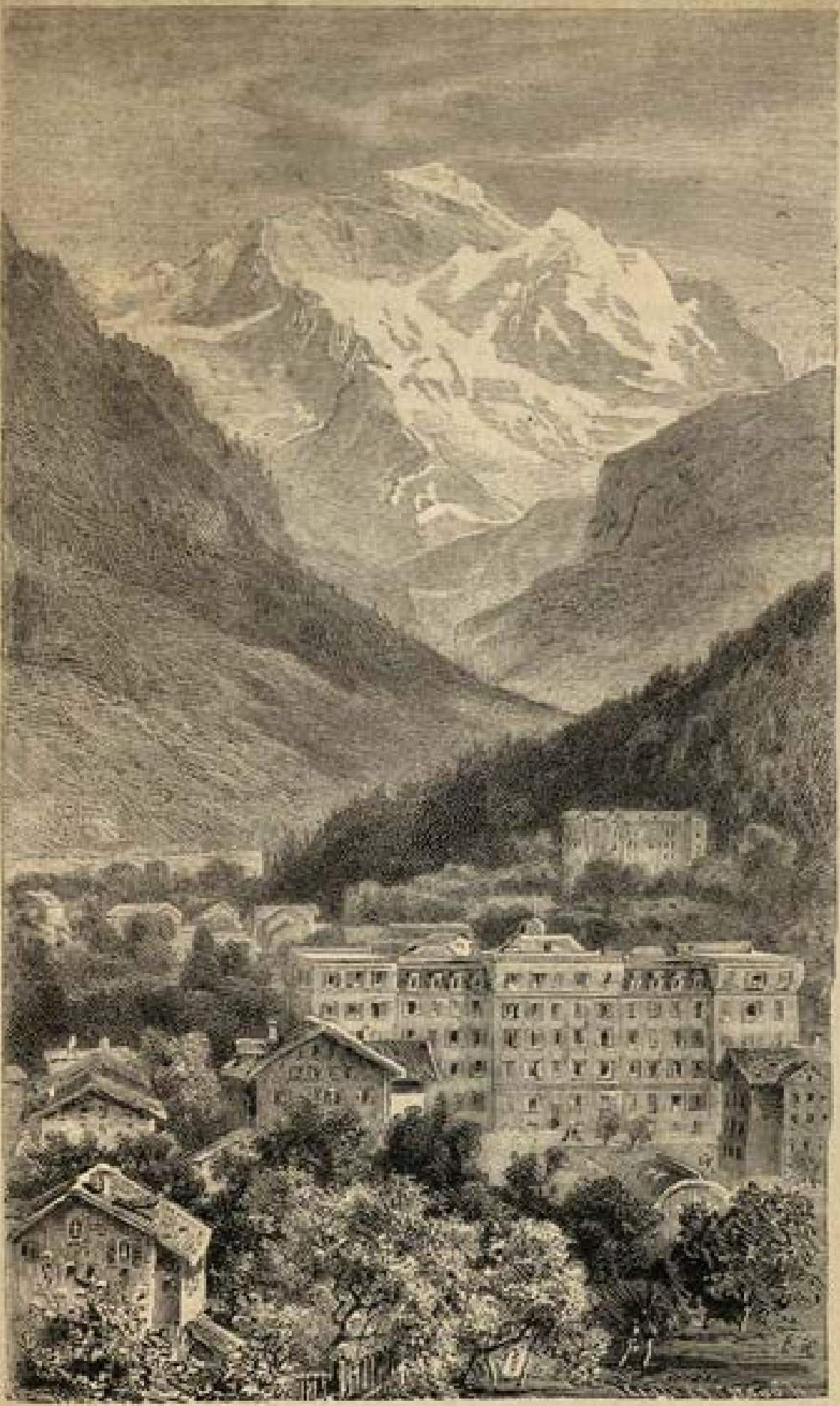
SWITZERLAND may be described in few words as the land of the central Alps and the Jura. In neither case do the culminating points of these mountains belong to Switzerland. Both the highest peak of the Alps and the highest summits of the Jura are now included within the political boundaries of France. Yet Switzerland contains the highest ranges of the Alps and the greater portion of the chain of the Jura, while the intervening plain makes up the rest of her territory.

At Berne, standing on the edge of the elevated platform that overhangs the Aar and commands the Swiss plain, one looks southwards over a rich valley gradually retreating to the recesses of the mountains, whose snowy peaks form a long and continuous but jagged line in the background. Standing on the summit of the Rigi, on the Lake of Lucerne, near the northern limit of the mountain region, one looks eastwards and southwards over a troubled sea of snowfields and glaciers, bare rocky scars and crags, and mountain forests and pastures, with lakes lying at the foot; while westwards and northwards the eye ranges over a wide plain gradually sinking northwards, and bounded on the north-west by the straight and uniform escarpment that limits the Jura on the side of Switzerland. In the south-east

the mountains rise not from low valleys but from plateaux. The general level of the lowest parts of the Grisons, or Graubünden, is at least 3200 feet, and the canton includes tracts at a much higher elevation. The valley in which lies the now celebrated health-resort of Davos-Platz is upwards of 5000 feet above sea level, and the valley of the Engadine, watered by the Inn, in the extreme south-east, has an elevation of 4900 to 5900 feet in its upper part, above Zernetz, and of 4900 to 3300 feet in its lower part, which is more sloping.

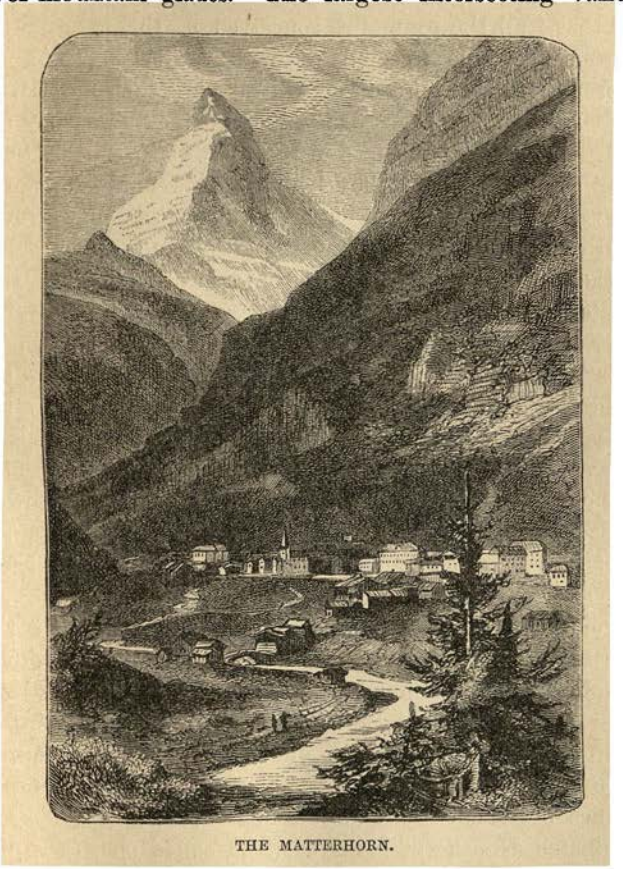
2. *The Ranges, Valleys, and Glaciers, of the Alps.*

A special advantage in the configuration of the Alps is presented by the number and size of the valleys. The longest and most important of these depressions follow the same direction as the main ranges. Such longitudinal valleys are formed by the upper course of the Rhone and of the Rhine in Switzerland, besides those of the Inn and Salza, Enns and Mur, Drave and Save, farther east. The Upper Rhone flows along the bottom of the valley bounded north and south by the principal chains of the Alps, the Bernese Alps in the north, and the Pennine and Lepontine ranges in the south. To the northern range belong the Wetterhorn and Wellhorn, the Schreckhorn and Finsteraarhorn, the Eiger, Mönch, and Jungfrau, all of them rising to upwards of 13,000 feet in height, while the Finsteraarhorn exceeds 14,000 feet; and to the Pennine Alps, the western of the two southern ranges mentioned, belong the peaks of Monte Rosa, Mont Cervin, or the Matterhorn, and (beyond the frontiers of Switzerland, as already stated) Mont Blanc, all approaching or exceeding 15,000 feet. Monte Rosa, on the frontiers of Italy and Switzerland, attains a height of 15,150 feet, and Mont Blanc rises to 15,732 feet. Naturally shorter



THE JUNGFRAU FROM INTERLAKEN. *To face page 122.*

and more abrupt, because lying athwart the main line of the ranges, are the transverse valleys, which are distinguished by a regular succession of narrow gorges and level mountain glades. The largest intersecting valleys



THE MATTERHORN.

are formed by the Reuss in Switzerland, the Etsch (Adige) in Tyrol, the Rhine between Coire (Chur) and Lake Constance, and the Rhone between Martigny and the Lake of Geneva.

Although in comparison with the loftiest ranges of other continents the Alps, which are, apart from the Caucasus, the highest elevations in Europe, assume a secondary position, Bonstetten was still justified in asserting that "all the grandeur conceived by the imagination must seem tame in contrast with the Alps." As we approach them from the north side we first meet with their forerunners, the *Voralpen*, or Fore-alps, as they are called by the Germans, from 4000 to 5000 feet high. Seen from a little distance they look like the outer ramparts, the regularly constructed exterior walls of the lofty stronghold of Europe, above which the rocky and snowy crests of the central mass glittering from afar often rise to a still greater height, thus resembling the pinnacles of the inner lines of the fortifications. These summits do not appear as isolated cones, but, springing in bold outline from the highest portion of the ridge, assume at one time the appearance of jagged crests, peaks, horns, or teeth, whence the various terms *pique, grat, first, dent, aiguille*, applied to them; at others resemble the rounded form of a tower, or else, as in Mont Blanc the highest of all, they assume the shape of a dome. Extensive snow-fields and masses of ice are embedded between their frowning walls. As the outflow of these eternal ice and snow fields of the upper regions, the glaciers, like lava streams, slide down in solid masses of snow and ice far below the snow-line, often continuing their course for from 20 to 30 miles down to within 3200 feet of the sea level, grinding their way through the deep channels of the enormous ravines by which the mountain-sides are furrowed. Accumulated deposits of stony detritus, called *moraines*, disintegrated by the freezing of the water in the fissures of the neighbouring rocky heights, form as it were a framework along the edges of the glaciers, and where two glaciers meet and unite the two contiguous side moraines

mark the line of junction as a middle moraine parallel to the lateral ones, while similar parallel moraines in greater number indicate the confluence of additional glaciers, the whole being finally deposited at the foot of the glacier as a *terminal moraine.*

These heaps of coarse detritus are a striking indication, and even a measure, of the amount of denudation effected in the higher parts of the mountains in glaciated regions. Nothing can withstand the expansive power of water in the act of freezing, and hence, when porous or fissured rocks are saturated with moisture, and this moisture solidified by frost, masses of the rock are chipped off. But the surface moraines do not measure the whole amount of the waste that is thus effected, for much of the materials of the moraine escape through crevasses or fissures in the glacier to the bottom.

Nor is it only in glaciated parts that the evidences of this kind of denudation are to be seen. The Dent du Midi and the Dent de Morcles, two jagged peaks standing as sentinels on opposite banks of the Rhone at the head of the plain above the Lake of Geneva, are strewn at their base with fragments of rock hurled down after heavy rains or sudden thaws, and so numerous and large are the blocks which at times descend that the bed of the river is obstructed, and the surrounding country threatened with inundation, so that men have to be sent to clear its course.

While the moraines thus indicate the mountain waste that is going on above, the muddy glacier streams, which escape from under glaciers at their lower end, afford an indication of the denudation that is being wrought by the grinding and ploughing of the glaciers themselves along the sides and bottom of their bed, even though, as already intimated, the sediment which these streams carry is not wholly of sub-glacial origin. Various calculations have

been made showing that this erosion by ice is much more rapid than that by water. It has been estimated, for example, that whereas 1600 years would suffice to reduce by one mètre (3 feet 3 inches) the level of the land under the Aar glacier, 4125 years would be required to bring about the same amount of denudation by water in the neighbouring valley of the Reuss.[1]

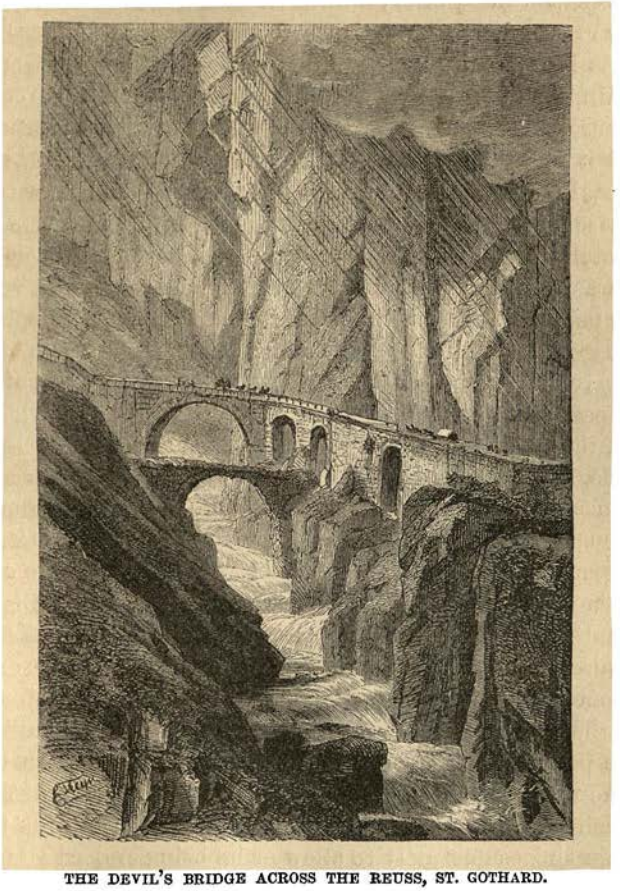
The Italian side of the Alps is naturally at once the grandest and most beautiful. Not only is the vegetation here far richer than in the central valleys and on the northern slopes, but the hills themselves sink much more abruptly, the masses of snow and ice thus assuming much more picturesque outlines, and forming the most vivid contrasts with the lower valleys blooming luxuriantly in the genial sunlight.

3. *Alpine Passes—Highways and Railways.*

On the configuration of the valley systems depend the Alpine passes, several of which have been almost wholly due to the labour of man. Some of them effect a communication between valleys confined to the north or Swiss side of the Alps, and of these the most celebrated are the Grimsel and Furka Passes at the head of the Rhone valley, connecting it respectively with the Hasli-Thal, or upper part of the Bernese Oberland, and the Urseren-Thal, or head of the valley of the Reuss, and the Gemmi Pass, a triumph of engineering skill, forming the only lateral communication between the Bernese Oberland and the Rhone valley. Others serve as the means of communication between Switzerland and Italy, and of these the most important are that of the Great St. Bernard in the Pennine Chain, that of the Simplon in the Lepontine Alps, that of St. Gothard at the head of the

[1] "*Glaciale Bodengestaltung*," by Dr. Albrecht Penck, in *Ausland*, 1882.

valleys of Reuss and Ticino, and those of Bernardino, Splügen, Septimer, Bernina, and others leading from the Grisons southwards. In all, the Alps are crossed by



THE DEVIL'S BRIDGE ACROSS THE REUSS, ST. GOTHARD.

about forty commercial highways, the shortest being those leading from one transverse valley to another. Still more numerous are the natural passes unprovided with roadways.

Here may be quoted an instructive remark of Desor, explaining the connection between the conformation of the mountains and the distribution of the passes. "As the central mass or crystalline nucleus has been upheaved to a greater height than the surrounding sedimentary rocks, these latter, however changed or transformed, must still be different in their appearance from the crystalline rocks themselves. They are also generally at a lower elevation, and it seldom happens that they reach the altitude of the crystalline formations. These relations are of the greatest consequence for the orography of the Alps. As each central crystalline mass presents a long or ellipsoidal nucleus, and as the highest point is on the whole coincident with the middle of the central mass, it follows that the depressions in the Alpine chain must correspond with the intervening spaces between the ellipsoidal or central masses. Here accordingly are found the accessible ridges and the principal Alpine passes of which any use has been made, except when the crystalline mass itself may by any chance happen to be intersected by cross valleys. Such, amongst others, are the Col di Tenda, the M. Cenis corresponding to the depression between the Cottian and Graian Alps, the Col du Bonhomme between Mont Blanc and the Western Alps, the Great St. Bernard, the Lukmanier, the Bernardin, the Splügen, the Bernina, to some extent the Stelvio, the Reischen-Scheideck, and above all the Brenner Pass, which is the oldest Alpine highway. The passes of the Eastern Alps all present well-nigh the same relations, those especially, such as the Rauris Pass, which lead over the Tauer range. Farther eastwards the chain sinks sufficiently to allow of its being crossed almost anywhere. In Switzerland there are scarcely more than two passes that do not follow the zones or depressions of the sedimentary rocks—the St. Gothard and the Simplon. But it must not be forgotten that the reason why the St.

Gothard is used must be sought for in the side valleys of the Reuss and Ticino, which are near enough materially to shorten the journey over the moderately elevated crest of the St. Gothard. The Simplon Pass again crosses the crystalline mass of like name at its extremity, where it has become very narrow and considerably lower; thence it soon reaches the valley of the Diveria, and farther on the defile of the Val Formazza, which falls little short of being a perfect cross-valley."

The Swiss Alps have now been pierced at their very heart by a railway tunnel. Between the spring of 1872 and that of 1880 a railway tunnel nearly 10 miles in length was driven through the great mass of the St. Gothard at the joint expense of the German, Swiss, and Italian governments, and that of some of the Swiss cantons most interested. The tunnel starts at Göschenen in the valley of the Reuss on the north, and ends at Airolo in that of Ticino on the south, and lies at a level of 3780 feet above the sea. A second railway tunnel through the Swiss Alps is now projected, and preliminary surveys have been made with a view to its construction. It is to pass under the Simplon Pass in the canton of Valais, and the length of the tunnel when completed would amount to nearly 12½ miles.

4. *The Jura Mountain System and the Swiss Plateau.*

The mountains in the north-west of Switzerland contrast with those in the east and south, not only in respect of their inferior height, but also in the regularity of their chains. The Jura Mountains are composed of limestone strata thrown into a series of long folds, which still mark the mountains and valleys. The anticlines and synclines are coincident with the ridges and furrows which are the leading physical features of the region. The Jura

arise in France, where their highest elevations (Dôle, Mont d'Or, etc., 5900-6000 feet) are to be found; in the south-west of Switzerland they possess several summits not much less in height, but gradually get lower, especially to the north of Solothurn, and finally sink to about 2000 feet above sea level. The Swabian Alps and the Franconian Jura, in south-western Germany, may be regarded as a continuation of this range. The slopes of the Jura are covered over vast areas with pine-forests, which give them a very sombre appearance, and the high valleys that occupy their folds are often bleak and uninviting. Like other limestone mountains, they are in many places hollowed out into caves, and allow the drainage to escape into subterranean fissures as in the Karst Region on the Adriatic (see AUSTRIA). The *Perte du Rhône* at Geneva, where the Rhone suddenly plunges into a deep limestone gorge, and disappears for 300 feet under the rock, is the best known example of this structure.

Limited southwards by the abrupt shores of Lake Leman, the Swiss upland plateau stretches out in a north-easterly direction at a mean altitude of 1380 feet between the Alps and the Jura, thus forming an extensive longitudinal valley, intersected by the widely-ramifying water system of the Aar, and reaching as far as Lake Constance and the Rhine.

5. *Rivers and Lakes.*

Switzerland being the country in which the mountains of central Europe culminate is naturally a land belonging to many different river systems. Its rivers belong to the basins of the North Sea, the Black Sea, and the Mediterranean, and in the Mediterranean it sends streams to both sides of the Italian peninsula. It is the land of origin of great rivers, not the land of their chief develop-

ment. The Rhine and the Rhone both take their rise here, the one destined to flow into the North Sea, the other into the western bay of the Mediterranean. The Ticino carries its waters to the Po, and thereby to the eastern bay of the same sea; and the Inn, rising in the Engadine, ultimately joins the Danube, which bears its waters to the Black Sea. All the first three rivers rise in the same mountain mass, that of the St. Gothard, but the Rhine is formed by the union of three distinct head-streams, known in German as the Vorder-, Mittel-, and Hinter-Rhein, the sources of the two latter of which lie farther east. In general the Swiss rivers are too rapid to be of much service for navigation. The Rhone is said to be the most rapid of the larger rivers of the world. The Rhine is navigable for vessels of 150 tons at Coire in the Grisons, but the most important of the navigable rivers of Switzerland is the Aar, the tributary of the Rhine, which, after traversing the Lakes of Brienz and Thun, winds across the Swiss plateau to join the main river about midway between the Lake of Constance and Basel.

The lakes of Switzerland, and the Alps in general, form a much more important hydrographical feature than the rivers. They are remarkable for their number, their size, their depth, and the beauty and grandeur of their scenery. As to their size, a misapprehension is often created by the fact that, from the smallness of the country, Switzerland, and therefore the Swiss lakes, are frequently represented on maps on an exceptionally large scale. Lake Leman, or the Lake of Geneva, the largest of all, has an area of about 220 square miles, or less than one-ninth of that of Lake Wener in Sweden. Both it and Lake Constance, or, in German, the Bodensee (208 square miles), belong partly to frontier countries, and Lake Neuchâtel, the largest of the lakes belonging entirely to Switzerland, has

an area of only 93 square miles. The depth of many of the lakes is in fact a more noteworthy feature. The greatest depth of the Lake of Geneva is 1099 feet, which makes its bottom not much more than 100 feet above sea level, and the bottoms of the lakes on the southern side of the Alps are actually below the level of the sea (see ITALY).

The Swiss lakes afford excellent illustrations of the function of lakes as filters and regulators of rivers. They are nearly all fed by rapid mountain torrents, which enter their upper ends thickly charged with sediment. This sediment is deposited when the rivers enter the lakes, and when they leave the lakes at the lower end they issue as clear streams. The turbidness of the Rhone as it enters the Lake of Geneva, and the remarkable limpidity of its blue waters when it quits that lake, are equally well known. As regulators of the rivers the Swiss lakes protect nearly all the lower valleys of Switzerland from disastrous floods. In time of flood the level of the lake gradually rises, and the fluctuations in volume of the lower course of the river are thus kept within moderate bounds. The Aar, however, even after leaving the Lake of Thun, is liable to have its volume greatly augmented at times in flowing over the Swiss plateau, which was in consequence formerly subject in certain parts to inundation; but this evil has recently been remedied by the construction of a canal diverting the Aar into the Lake of Bienne, or Biel, and thus enabling that lake to serve as the regulator of the lower course of the river.

The Swiss lakes likewise illustrate in a peculiarly striking manner the destiny of lakes to contract their limits and to become gradually obliterated. There is evidence to show that nearly all of them are now much smaller than they were formerly. The surface of the Lake of Geneva is estimated by J. Favre to have been

nearly 250 feet higher than at present, and at that time the upper end of the lake would be at Martigny, where the Rhone suddenly turns to the north-west. According to Rütimeyer the Lake of Constance once reached to Bendern in the principality of Lichtenstein; that of Brienz to Meyringen; the Bay of Uri, the upper arm of the Lake of Lucerne, (the Vierwaldstädtersee, or Lake of the Four Forest Cantons, as it is called by the Swiss), to Erstfeld, making the Bay of Uri twice as long as it now is; the Lake of Wallenstadt half-way to Sargans on the Rhine. Similar estimates are made for the lakes on the Italian side of the Alps, and in some cases the upper ends of these lakes are known to have been considerably higher even in the time of the Romans.[1]

The reduction in size that has since taken place is due principally to the lowering of the level of the outlet through the eroding action of the rivers draining them, but simultaneously with that the process already referred to, the deposition of alluvial matter at their upper ends, has led thus to the formation of deltas which are constantly increasing in extent. Through the operation of such causes several Alpine lakes have been entirely converted into dry land within historical times. The verdant valley of Urseren, which opens on the right from the pass of St. Gothard as one ascends from the south, is an example of an Alpine lake that has undergone this fate.[2]

Some of the Swiss lakes are remarkable for the differences of level sometimes observed in different parts of them, in consequence of differences in atmospheric pressure. Such variations on the Lake of Geneva are known to the French as *seiches*, while on the Lake of Constance they are known to the Germans by the name of *Russen*.

[1] Credner, *Die Deltas*, pp. 73, 74: Gotha, 1878.

[2] As to the origin of the Alpine lakes, see INTRODUCTION, p. 25, *et seq.*

6. *Geology and Minerals.*

The geological structure of Switzerland is extremely complicated. It will perhaps be most easily understood by regarding the plateau, stretching from south-west to north-east between the Lakes of Geneva and Constance, as an area of Tertiary (chiefly Miocene) deposits separating two mountainous areas composed mainly of rocks of more ancient date. The mountains on the west, the Jura, give their name to the rocks of which they are composed, and which are here extensively developed. The eastern limit of these Jurassic strata is indicated approximately by the western shores of the Lakes of Neuchâtel and Bienne, and by the lower course of the Aar. The mountains east of the plateau are mainly formed of gneiss and mica-schist, with patches of granite here and there, but in many places, and especially in the south-east (the Grisons), various slates are also largely developed. But between this crystalline and metamorphic core and the Tertiaries of the plateau, there are various sedimentary rocks which have shared in the upheaval that gave rise to the Alps. The lowest of these are Triassic rocks in the Grisons north of the Vorder-Rhein and in the canton of Glarus, and these are followed by Jurassic formations which stretch in a continuous belt from Lake Wallenstadt to the bend of the Rhone above the Lake of Geneva. Reappearing farther west, there can be no doubt that these strata dip under the Tertiaries of the plateau to unite on the other side with the Jurassic rocks of the mountains of Jura. The same rocks, Triassic and Jurassic, are also found on the east of the slates of the Grisons among the Albula Mountains and in the Engadine. Cretaceous rocks succeed the western belt of Jurassic deposits, and these again are followed by lower and upper Tertiaries, the former, as late as the Miocene, having been upheaved, as

we have already seen, to great elevations (see INTRODUCTION, p. 12).

A similar series of Secondary and Tertiary strata succeeds the central gneissic core also on the south side of the main chains of the Alps—in Italy and in Austria; and as both on the north and south the rocks of which these strata are composed are mainly limestones, the name of "Limestone Alps" is frequently given, especially in Germany, to these outer portions of the range. Formations of a different lithological structure are, however, also pretty extensively developed both in Switzerland and other parts of the domain of the Alps. In Switzerland, for example, there are two characteristic non-calcareous formations that deserve to be particularly mentioned. One of these is called *flysch*, and consists mostly of a group of dark-coloured slates, marls, and sandstones, overlying the Eocene, remarkably poor in animal remains, but rich in relics of a fucoid vegetation. The other is the *molasse*, a term sometimes applied to the Miocene and Oligocene deposits of Switzerland generally, but in a more special sense restricted to a soft green sandstone occupying an extensive area in the northern regions of the Alps. The *nagelflue* is a conglomerate belonging to the molasse group, and reaching a thickness of 2000 feet on the Rigi.

But the most remarkable feature in the geological structure of Switzerland, and of the Alps generally, is one that cannot be shown on a map merely indicating the superficial outcrop of the strata. It consists in the extent to which the strata on the flanks of the Alps have been folded, contorted, and inverted by the tremendous forces that led to the elevation of these mountains. The typical structure of the Alps is seen, for example, at St. Gothard, where what is known as the fan structure, due to the enormous lateral compression which accompanied the elevation of the Alps, is very well seen. There the

central core crops out at the summit of the ridge, and the strata on each side of it, north and south, dip inwards towards the base of that core, so that when seen in section they would present the appearance of the blades of a fan radiating from a single point. [1]

The minerals of Switzerland are far from abundant. The most widely diffused is *iron* ore, which is worked at various places. *Salt* is obtained at Bex, a little above the Lake of Geneva, from deposits of Jurassic age; *asphalt* in the Val de Travers in the canton of Valais; *sulphur* near Lake Thun. *Argentiferous copper* and *lead* ores were formerly worked in the Grisons. Mineral springs of great celebrity are pretty numerous, the most noted being those of Leuk (Louèche) in the canton of Valais, Pfeffers in St. Gall, St. Moritz in the Engadine, and Baden and Schinznach in Aargau.

7. *Climate and Vegetable and Animal Life.*

The great differences in elevation in Switzerland necessarily cause great differences in the climate, and more especially in the temperature. At places situated north of the Alps, such as Zürich and Bern, the normal winter temperature is about 30° F., the summer temperature from 50° to 64° or upwards; at Geneva the corresponding temperatures are as high as 33° and 66°. Some of the high-lying valleys, on the other hand, have a range of temperature which fully justifies the description that has been jocularly given of their climate, as one characterised by nine months' winter and three months' cold. This is especially the case with valleys that are open to the east and closed to the west, like the little valley of Urseren between the Furka and the pass of St.

[1] On the "Building of the Alps," see Prof. Bonney, *Nature*, vol. 30, 1884, pp. 44, 65.

Gothard, and the valley of the Engadine in the south of the Grisons. At Sils Maria, in the upper part of the latter valley (5900 feet above sea level), the mean January temperature is $17\frac{1}{2}°$ Fahr., the mean July temperature only 53°, and the mean of the whole year $34\frac{1}{2}°$. In general the valleys have a severer winter than mountain peaks of equal elevation, the reason being that the colder and therefore heavier air steadily sinks down to the bottom of the hollows. One notable feature of the confined valleys of Switzerland, as well as of other mountainous regions, is the prevalence of calms. The same is true even of isolated summits, such as the Rigi Kulm, which is protected on the south and east by still higher mountains; and, indeed, at the majority of Swiss stations the number of calms exceeds that of all the winds put together.[1] In the higher valleys this condition is also accompanied by dry clear weather, especially in winter, and it is this circumstance that makes such cold places as Davos-Platz, in one of the high valleys of the Grisons, a suitable resort for certain classes of invalids suffering from lung disease. Some of the valleys opening to the north, and especially the valley of the Reuss, have a much warmer climate than the adjoining districts, in consequence of the prevalence of the föhn, an account of which is given in Chapter I. (pp. 44-5).

The flora of the Alps is one of peculiar interest. Like all great ranges of high mountains, the Alps harbour a considerable number of plants found nowhere else, and of those which are found elsewhere the majority do not reappear in the plains and valleys beneath, but in distant mountains or in the Arctic Regions. Out of upwards of 800 species belonging to the Alps, but not to the adjoining lowlands, nearly one-fourth are absolutely restricted to these mountains, and nearly a fifth are found also in

[1] Dr. Alex. Supan, *Statistik der unteren Luftströme*, p. 80.

the Arctic Regions, these being what are hence known as Arctic-Alpine plants.

Here as elsewhere the elevation of the mountains causes a gradual change in the aspect of the vegetation as we ascend. In the valleys at the base the chestnut and the walnut grow freely even on the north side, while in the valleys opening to the south, towards the Mediterranean, we enter the zone occupied by these trees while still at a considerable elevation. As we ascend higher we come to the zone of the beech, maple, and other ordinary foliage trees reaching to about 4000 feet, and then the zone of firs and pines rising about 1000 feet higher. This zone is followed by one of Alpine shrubs, among which rhododendrons (Alpine roses, as they are locally called), heaths, and whortleberries are conspicuous, along with larches, and two species of pine, the dwarf-pine (*Pinus pumilio*), and the cembra-pine, remarkable for its edible seeds, the latter peculiar to this zone. The shrubs cease to grow at about the height of 7000 feet, but the Alpine plants that cover the pastures intermingled with the shrubs ascend to the snow-line, and often beyond in places too steep to allow the snow to lie, and otherwise fit for vegetation. On the peaks of the Grisons Heer collected about 100 different species of flowering plants at stations above the snow-limit, there situated at about 8500 feet; 24 species were observed by Martins upon the Grands Mulets on Mont Blanc, at the height of from 9890 to 10,600 feet;[1] and in the month of August the sides of the Pizzo Centrale on the St. Gothard have been known to diffuse to a considerable distance the fragrance of the flowers with which they were covered in patches. One of the most admired but most retiring of these snow-loving plants is the celebrated Edelweiss,[2]

[1] Grisebach, *Vegetation der Erde*, i. 173-74.

[2] *Gnaphalium leontopodium.*

which all Alpine tourists are so anxious to add to their souvenirs of the country. No belt of cryptogamic plants separates the flowering plants from the snow-line, since the moisture that gradually trickles from the edge of the snow and ice soon becomes sufficiently warmed to admit of the development of plants of higher organisation.

The great variety of species to be found in many places within a limited area on the Alps is very noteworthy. On various points on the slopes of single mountains it is not difficult to collect hundreds of different species, and even on stony and rocky slopes not well suited to vegetation, where accordingly the amount of bloom is very limited, the number of species that may be obtained is sometimes very considerable.

Among the members of the Alpine fauna we need note particularly only the marmot, a peculiar rodent which inhabits burrows on the mountain-sides near the edge of the snow-line, and has a peculiar habit of sitting erect on its hind legs, on the watch against enemies, when it comes out of its burrow to enjoy the sunshine.

CHAPTER V.

AUSTRIA.

1. *Extent and General Relief of the Land.*

THE Austro-Hungarian monarchy, lying to the south-east of Germany, extends over about 9° of latitude, and upwards of 16° of longitude. The greater part of the vast area forming this monarchy is mountainous. This description applies to almost all the territory on the west as far as the southern bend of the Danube, to Transylvania on the east, and a large part of Hungary and Galicia on the north and north-east; but a very extensive plain is left in the middle of Hungary watered by the Danube and its great tributary the Theiss.

2. *The Western Highland Region.*

Bohemia is that part of the Austrian dominions which has the greatest length of frontier on the side of Germany, from which, however, it is separated by three ranges of mountains,—the Böhmerwald on the south-west, the Erzgebirge on the north-west, and the Riesengebirge on the north-east. Its surface has the form of a rhomboidal plateau, the fourth side of which is formed by a range of low hills forming the boundary with Moravia. The general slope of the plateau is towards the north, whither it sends all its drainage to the Elbe, chiefly by the Moldau. Of the mountain boundaries of

the plateau the highest are the Riesengebirge, which contain some peaks above 5000 feet in height, and hence have acquired their name, meaning "Giant-mountains." The next in height are those belonging to the opposite range in the south-west, the Böhmerwald, especially the southern portion, to which that name more properly belongs. Here extend several parallel chains of mountains connected by transverse ridges, and clothed with one vast forest of giant conifers. Some of the peaks rise to above 4500 feet in height. Towards the north these mountains sink in elevation, and gradually lose themselves in an elevated plateau. The Erzgebirge are less remarkable for their height—none of the summits reaching 4000 feet—than for their precipitous character, and for the rich ores (*Erze*) which they contain, and to which they owe their name.

Moravia, somewhat resembling Bohemia in shape, is likewise enclosed in a great measure by mountains, but towards the south it is open, and its general slope being opposite to that of Bohemia, the drainage passes southwards by the March or Morava to the Danube. The Sudetes, on the north, belonging partly also to Germany and partly to Austrian Silesia, have some peaks above 5000 feet in height.

Upper and *Lower Austria*, which are contiguous to Bohemia and Moravia, on the south, are much alike in their general character. They are both traversed from west to east by the Danube, and their northern portion is mainly hilly, but intersected by deep river beds. In the east the surface of Lower Austria gradually sinks down to the plain of the Marchfeld. South of the Danube both divisions are traversed by spurs of the Noric Alps, with summits between 6000 and 7000 feet in height (Schneeberg and Oetscher) in the upper, and others, from 8000 to 10,000 feet (Dachstein, Priel, etc.),

in the lower division. In the latter the less elevated range of the Wienerwald in advance of the Alps is richly clad with vineyards. In the south of upper Austria lies the *Salzkammergut*, a district which contains more lakes than any other part of the Austrian Alps, and which owes its name—meaning "Estate of salt-chambers"—to the circumstance that it possesses enormous deposits of rock-salt. An entire mountain in this region, the Salzberg, is composed of this mineral. On the borders of lower Austria and Styria the railway from Vienna to Trieste is carried across the Semring Alps in a series of curves with steep gradients, passing in the route through fifteen tunnels and across as many bridges. The total length of this Alpine railway is 25 miles.

As we advance still farther southwards into Salzburg, Styria, Tyrol, Carinthia, and Carniola, we get into the heart of the Austrian Alps, by which these provinces are traversed. *Tyrol* is as much as Switzerland a land of lofty mountain peaks, snow-fields and avalanches, glaciers and mountain torrents, and is only second to Switzerland in the grandeur and picturesqueness of its scenery. The Alps enter it from the west in three parallel chains, but of these the middle one—the Oetzthaler Alps—is by far the most important, dividing Tyrol into a *northern* half with a severe climate, and with a drainage belonging to the Danube, and a *southern* portion, which is drained by the Etsch (Adige) into the Adriatic, and possesses a climate resembling that of the northern valleys of Italy. Like them it is liable in summer to excessive heat. In the Hohe Tauern, a portion of the Oetzthaler chain, the Gross Glockner, the loftiest mountain in the Eastern Alps, attains the height of 12,460 feet, and the Gross Venediger, belonging to the same division of the chain, in Salzburg, also exceeds 12,000 feet in height. The Tyrolese Alps are now pierced at two points by railway tunnels. A tunnel

below the Brenner Pass in the Oetzthaler chain on the route from Innsbruck to Botzen (Bolzano) has existed since 1867, and the piercing of one through the Arlberg in the north-west was completed in November 1883. The latter is nearly 6½ miles in length, and accordingly the third longest of the railway tunnels of the world.

In *Styria*, which is almost entirely mountainous, there are spurs of the Noric and the Carnian Alps with many summits of about 8000 feet in height. The whole drainage in this case belongs to the Danube. *Carinthia*, lying between the main chain of the Noric Alps (a continuation of the Oetzthaler Alps in the north), and the Carnian Alps in the south, is, in general, mountainous and sterile; so also is *Carniola*, which is traversed from north-west to south-east by the Julian Alps. Both provinces are among the most thinly-populated parts of the Austrian dominions. A low spur of the Alps, with few heights exceeding 3000 feet, and all richly wooded, traverses the northern part of the Croato-Slavonian province between the Drave and the Save. Towards the east it gradually sinks into rich undulating country, covered with orchards and vineyards, especially in the highly-cultivated district of Syrmia extending along the Drave in the east. *Croatia* and the adjoining territories on the south and west are much subject to earthquakes, the centre of the disturbed region being at Agram, which was greatly injured by an earthquake that occurred in November 1880.

3. *Region of the Karst: its Grottoes and Dolinas.*

In the south of Carniola there begins a region known as the Karst, which is one of the most remarkable in Europe in respect of its physical features. By the term Karst, or, as it is called in the Italianised form of the word, Carso,

is more particularly understood the limestone stretching from the mouth of the Isonzo, in the Gulf of Trieste, to the Gulf of Quarnero in the Adriatic. It thus includes portions of Carniola and the so-called coast-land with the Adriatic peninsula of Istria; but in a wider sense the term is applied to the whole mountain range which forms the connection between the Alpine and Thraco-Illyrian mountain systems, and under the name of the Julian, and farther on of the Dinaric Alps is often regarded as forming an integral portion of the latter, as well as to many parts of the area belonging to Croatia and Dalmatia on both sides of that range.

In its more limited application the Karst is a stony desert lying to the north and the south of Trieste, an expanse presenting a scene of utter desolation in striking contrast both to the verdant region from which one emerges upon it in coming from the north, and also to the richly-wooded coasts which here border the Adriatic. It is a region of limestone rocks thrown into wide folds, synclines and anticlines, the tops of which sometimes have the aspect of minor plateaux and sometimes of successive terraces. But the peculiar physical characters of the region are due to the way in which the rocks have been acted on by atmospheric agents. The rock is full of fissures and underground caverns. The rain that falls upon it does not trickle down to the lowest line in a valley and then flow away as a river, but disappears underground through the numerous fissures; or if a river is formed, it remains above the ground only for a comparatively short distance, and then disappears to continue its course as an underground stream till it manages to escape again by some other fissure lower down. Frequently it does not do so till it reaches the coast, and sometimes it only re-emerges under the sea, giving rise to a submarine spring. In consequence of the great

amount of underground erosion that has thus taken place the ground has frequently given way, so that numerous trough-like depressions, called by the Slavonians *dolinas*, have been formed. There the water is able to linger for a longer period than on the surface, and hence the bottoms of these dolinas acquire a tolerably thick soil and a rich vegetation. Mostly, however, the dolinas are only large enough to accommodate a few trees at their bottom, although here and there such trough-like depressions occur of sufficient size to contain an entire village surrounded by fields and orchards.

Of the caverns of this region, the most celebrated is that of Adelsberg, at the foot of the Julian Alps.

VIEW IN THE ADELSBERG CAVE.

Not far from this cavern is the no less celebrated Lake of Zirknitz, which illustrates in a striking manner another consequence of the peculiar underground structure of this region. For a number of seasons together the

bed of this lake may remain quite dry and be used for cultivation, while at other times it is occupied by waters teeming with fish. On a smaller scale the same phenomenon is observed in numerous other lakes of the region, lakes that are much smaller in size, and hence more rapidly and more frequently filled and emptied. The phenomenon is due to the fact that the underground outlets for the superficial water are sometimes comparatively empty, sometimes overflowing. In the former case the fissures communicating with these periodical lakes serve as channels to lead away the water, in the latter as vents to pour it on the plain.

Another phenomenon of the same region is the *bora*, the violent wind already described in the Introduction. It is partly in consequence of this wind that the desolate character of the region is maintained. It carries away almost every particle of soil which the unfavourable conditions of the surface allow to be formed; it hurts vegetation where vegetation is possible; and it absolutely prevents the growth of trees in every spot not sheltered from its fury.

Such are the conditions which prevail throughout the Karst proper; but similar conditions are found in many parts of the wider region above indicated, and for that reason the name has been extended to them also. These areas were not always in this condition. In the time of the Romans the whole region was well wooded, and there are data to prove that the conversion of productive land into a stony desert began in certain parts only from 150 to 300 years ago. The presence of woods over large areas is an essential condition for the formation and preservation of a surface layer of soil, and the destruction of woods through fires, through the keeping of goats, which destroy the young trees, and in other ways, has now gone

on for generations, resulting in the present condition of the district.[1]

4. *The Hungarian Highlands.*

Under this term are included all the mountains enclosing the Hungarian plains, with the exception of those belonging to the western provinces already described. Except in the region lying within the sharp angle formed by the Danube, where it makes its southward bend, they consist entirely of the Carpathians. But in that angle we have the last of the spurs of the Alps north of the Danube. The Bakony Wald, a low mountain range of about 2000 feet in height, a continuation of the Noric Alps, extends from south-west to north-east, right up to the point where the Danube turns to the south. It is richly clothed with forests, in which the oak and the beech predominate, and contains extensive and valuable quarries of marble.

The Carpathians, the second great mountain range of central Europe, take their rise on the eastern frontier of Moravia, and hard by the Danube. They describe a semi-circle of about 880 miles in extent, starting at Pressburg and ending at Orsova, also on the Danube, and cover a total area of about 22,500 square miles. Flanked round about by lowland plains, they consist of two great mountainous areas—the North Hungarian and the Siebenbürgen or Transylvanian highlands, connected together by the chain of the Carpathian Waldgebirge or Wooded Mountains.

The Carpathians are far inferior to the Alps in height, no single peak reaching 10,000, and but few exceeding 6500 feet. The highest, the peak of Gerlsdorf in the Tatra group at the most northerly part of the curve, is

[1] See *Wesen und Ursachen der Verkarstung*, by Prof. S. Franges, *Ausland*, 1883, p. 767.

no more than 8700 feet in height. Hence these mountains also lack the great glacier-filled valleys so characteristic of the Alps. On the other hand, volcanic masses, such as basalt, trachyte, etc., occur much more frequently. The two systems also differ in the absence of longitudinal valleys in the Carpathians, a feature so highly developed and so favourable to intercourse in the Alpine highlands. In different parts the Carpathians present very different physical features corresponding with differences in geological structure. The wildly-weathered granite rocks of the Tatra, exhibiting scenes of savage grandeur unparalleled elsewhere in Europe, save in the mountains of southern Spain, stand out in sharp contrast to the broad flat sandstone ridges of the Carpathian Waldgebirge.

The North Hungarian Mountains fill the area in the north-west of Hungary, between the upper part of the Theiss and the Danube, before it turns to the south. From the extreme north and north-west they descend for the most part in a series of terraces towards the Hungarian plains, rising here and there, however, into chains of greater or less length and elevation. Towards Galicia the descent of the Carpathians is more rapid. The numerous spurs which are here sent out laterally terminate on a wide plain forming part of the great plain of northern Europe. East and west of the Tatra the culminating line of the Carpathians goes by the name of the Bieskid Mountains. Over the Western Bieskids the Jablunkau Pass leads from Silesia into Hungary at a height of less than 2000 feet above sea level. The Eastern Bieskids are rather a broad, low mountainous region than a chain of mountains—a region with few mountain peaks, but at the same time few mountain passes. Going still farther east and south we come to the Waldgebirge, the extensive beech-forests of which have given the name of Bukowina, "land of beeches," to

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the territory on the south-east of Galicia. In the Transylvanian region the long ramifications proceeding from the central chain traverse the whole land, and are frequently intersected by tremendous chasms several thousand feet in depth.

5. *The Hungarian Lowlands—The Pusstas.*

The Carpathians, with the eastern projections of the Alps, encircle the Hungarian lowlands, which are watered by the Danube, and its parallel tributary the Theiss. These lowlands are divided into two sections—the upper Hungarian plains, above the great bend of the Danube at Waitzen, and the much larger lower Hungarian plains below that bend, and stretching north-eastwards between the North Hungarian and Transylvanian Mountains. The former lies north and south of the Danube, and is enclosed by two spurs of the Carpathians which meet two corresponding spurs of the Alps at Pressburg and Waitzen respectively—that is, at the entrance of the Danube into Hungary, and at its great bend. The latter is the portion watered by the great southern reach of the Danube and by the Theiss with their tributaries, and is the region of the so-called "*pusstas*," a region that gives a correct idea of the steppes which form such a prominent feature of the western portion of the Asiatic continent. In the Hungarian plains nature is stripped of all her charms. The monotony of an interminable expanse, broken here and there by a few trees, or by the tower of some distant township shimmering in the glowing atmosphere, soon wearies the curious eye of the lonely wayfarer, while a depressing effect is produced on his spirits by the noiseless calm of the surrounding wastes. Yet in their still grandeur a certain poetry hovers over the pusstas, while the somewhat frequently-recurring pheno-

menon of the *fata morgana* may even act as a stimulant to the stranger unfamiliar with such atmospheric effects.

6. *Rivers and Lakes.*

By far the greater part of the Austrian empire belongs to the basin of the Danube. Bohemia, we have seen, forms part of the basin of the Elbe; the small territory of Austrian Silesia belongs to that of the Oder; the greater part of Galicia to the basins of the Dniester and Vistula; a very small portion of Hungary is drained by the Poprad into the Vistula; the southern Tyrol is drained by the Etsch, or Adige, and a strip on the south-west likewise sends its waters into the Adriatic; but with these exceptions the whole territory of the Austro-Hungarian monarchy drains into the Danube,—a river which forms the great main artery dividing the territory into two not very unequal portions.

This great river, the largest in Europe in respect of its volume of water, enters the Austrian dominions as a navigable stream at the gorge of Passau, where it is joined on the right by the Inn. Till it leaves Austria proper its banks are pretty closely hemmed in by the Alps, and the river passes through a succession of narrow defiles. Between Linz and Vienna it is said to rival, if not to surpass, the Rhine below Bingen as regards the picturesqueness of the scenery on its banks, and more particularly on the south, where it skirts a succession of smiling valleys overlooked by lofty mountains clad with sombre forests or mantles of snow and ice. During part of this course, between Grein and Dürrenstein, it passes through a narrow gorge obstructed by rocks and islets; but below the latter point it spreads freely over a plain of great fertility. Soon after receiving the Morava on the left its bed is again constricted at Pressburg, where

it passes through what is called the Carpathian Gate, between the Alps and Carpathians. It then breaks up into a number of branches, forming a labyrinth of islands known as *Schütten*, covering an area of about 600 square miles, terminating at Komorn; but on emerging at Gran and Waitzen from this section of the Hungarian lowlands, it flows uninterruptedly southwards as a broad and, considering its volume, a rapid stream over a wide plain, till it is deflected to the west, where it receives the Drave on the right, on the frontiers of Hungary proper and Slavonia. At Belgrade, where it receives its other great tributary on the right bank, the Save, its channel is obstructed by rocks, and for sixty miles before entering Roumania at what is known as the Iron Gate, the river passes through a series of difficult gorges, which form a sort of connecting link between the Carpathian system and the Servian highlands. The first of these defiles stretches from Golubatz almost to Dobra, its upper section being composed of Jurassic limestone walls with numerous caverns, while in the lower portion the steep banks and rocky shoals in the stream chiefly consist of crystalline schists and granite. At Drenkova begins the second or Greben defile, the Upper Klissura, after which follow the rapids of Izlash, the Upper or Lesser Iron Gate (*Gornje Demir Kapi*), formed by the reefs of Tachtalia and Izlash, and heretofore often confounded with the true Iron Gate below Orsova. There soon succeeds the magnificent scenery of the third and grandest gorge—the Kasan-Klause, or Lower Klissura. Lastly, at the Old Orsova we come upon the dangerous reefs of the Iron Gate properly so called.

A rocky ledge about a mile in breadth, with tooth-like points projecting above the surface, lies athwart the stream, which, when the river is low, forms a fearful cataract of tumultuous seething waters. As far as the

flourishing Roumanian town of Turnu-Severinu the wooded hills keep close to both banks, after which they become rounder and lower, gradually receding farther and farther from the river.

THE IRON GATE ON THE DANUBE.

It has sometimes been surmised that the rocky gorge of the Iron Gates was once closed, and that the Danube burst its way through the pass. According to some authorities the great plains of Hungary between Belgrade and Pesth and Tokay were once covered by the waters of an enormous fresh-water lake, which may have occupied an area at least half as large as the Adriatic Sea, if not even larger. If this were so, then the overflow of the water of the lake to the east may have gradually cut out the gorge of the Iron Gates, as indeed it is deepening it by degrees even now.

But there is another view of the case which requires

investigation. The great plain of Hungary, through which the Danube and the Theiss flow from north to south, is almost entirely bordered by Miocene strata, which pass under the vast alluvial flats, and only here and there rise through the alluvium in a few island-like patches. If the flat-lying scarped Miocene tablelands once spread across and covered the entire plain, then their present scarped forms on the borders of the plain are the result of denudation, by which the Miocene strata that once overspread the intermediate space have been gradually removed. If so, this was the manner in which it was done. In old times the Danube and its affluents flowed at a high level across the surface of this ancient plain, and began to cut out the gorge of the Iron Gates, and in proportion as it was deepened the sediment won from the Miocene strata was borne seawards, till at length, the gorge gradually being cut deeper, a vast area of the soft Miocene beds was worn away by the wandering Danube and Theiss, so low that the whole area from which they were removed was reduced to a vast lowland plain covered by the alluvia of these rivers, which even now cannot be easily restrained within what we call their legitimate channels. The case, on a larger scale, is parallel to that of the Rhine between Basel and Bingen, which began to scoop out its gorge at a time when the whole of that great plain was filled with Miocene strata, the surface of which was gradually lowered in proportion to the gradual deepening of the gorge, worked out by the river between Bingen and the Drachenfels.

Within Austrian territory the Danube is navigable throughout its course for vessels of 100 tons. It is navigable for steamers to Regensburg (Ratisbon), nearly 1500 miles above its mouth. The Save, the Drave, and the Theiss are likewise ascended by steamers, the first to Sissek, 370 miles above Belgrade, where it joins the

Danube; the second to the mouth of the Mur, 150 miles above its union with the main stream; and the third to Tokay, a distance of 475 miles from its mouth. Steamers also ascend some way up the Maros, one of the tributaries of the Theiss. The other navigable tributaries of the Danube, the March or Morava, the Waag, and the Inn, cannot be ascended by steamers, the first by reason of its shallowness, and the other two on account of the rapidity of their current. Nevertheless the figures above given show that even without these the system of the Danube admits of upwards of 2500 miles of steam navigation on its waters. Unfortunately, however, there are two serious hindrances to the navigation in the main stream itself. One of these is the obstruction at the Iron Gate just described which during the season of low water absolutely prevents the passage of merchant vessels; and the other is the tract between Pressburg and Komorn, or more precisely between Theben and Gönyö, where the main stream breaks up into numerous branches, which shift about from year to year among the alluvial *Schütten*. Until these obstacles are removed the navigation cannot attain the importance which it might acquire. As it is, the total tonnage of merchandise annually carried on the Danube, exclusive of the part of its course below Galatz in direct communication with the Black Sea, is only three-fifths of that borne by the waters of the Elbe.[1]

In another respect, too, the Danube is rather a hindrance than an aid to communication, for its breadth and the momentum of its waters make it difficult to bridge it over; and, with the exception of a bridge of boats at Neusatz or Peterwardein, between the mouths of the

[1] See Lanfranconi, *Ueber die Wasserstrassen Mitteleuropas und die Wichtigkeit der Regulirung des Donaustromes*, Pressburg, 1880; W. Götz, *Das Donaugebiet mit Rücksicht auf seine Wasserstrassen*, Stuttgart, 1882; and articles by the same in *Ausland*, pp. 67, 148, 163, 1882.

Drave and Theiss, there is in fact no bridge across the Danube below Pest.

Moreover, the main river and its great tributaries are often disastrous to the land in another way. The plains crossed by them, and more particularly the tracts bordering on the Save and the Theiss, are very subject to inundations. In a large measure this is due to the obstructions in the bed of the main stream after it has passed Belgrade. An increase in the volume of water cannot be carried off with sufficient rapidity. A rise of 13 feet in the level of the Danube causes the Theiss to flow backwards as high as Szegedin, 87 miles above its influx into the main stream. Szegedin itself was in large part overwhelmed by an inundation in 1879. Efforts have been made to ward off such disasters by the erection of embankments. In the course of the Theiss, one of the most sinuous of European rivers, numerous cuts have been made to reduce the length of its windings, and the bed thus formed, about 300 miles shorter than the original bed, has been protected by embankments, which in 1872 had a total length of 776 miles. But after all has been done, it is impossible to guard completely against the risk of inundation, and it has even been asserted that the risk in certain parts has been increased by this system of cuts and embankments through the increase in the volume of water thus confined to the main bed of the river. It cannot be doubted that an inundation is thereby rendered liable to be all the more disastrous when it does occur, and it is believed by some that, though the embankments have undoubtedly afforded a local protection in different parts of the river's course, yet the country has not benefited on the whole by their construction.

One consequence of this liability to inundation is that the land on the banks of these rivers is extremely marshy. This is particularly the case with the country

on the left bank of the lower course of the Theiss. That river there receives at right angles on its left bank two large and rapid affluents, the Maros and the Körös, and the force of their current is gradually driving the bed of the main river farther to the west. At Peterwardein it is stated to be shifting 18 inches westwards every year, and within a comparatively recent period the lower bed of the Theiss has been shifted about 60 miles. The tract left behind on the east may almost be described as one vast marsh, traversed in places by deserted channels of the river, sometimes exact facsimiles of the corresponding parts of the actual bed, except that they contain water with no current or no water at all.

The lakes of Austria are not numerous. The highland lakes of the Alps and the Carpathians are all small, and the only considerable lakes are in Hungary, west of the Danube. Lake Balaton, or, as it is called in German, the Plattensee, is the largest, having a length of about 50 and an average breadth of 10 miles. It lies at the foot of the Bakony Wald, which gives a somewhat picturesque appearance to its northern shores, though on the south its banks are low and swampy. It is nowhere deep, the average depth being 20 feet, while the deepest part is only 150 feet. It has often been proposed to drain it, and about 500 square miles of swamp on its banks have actually been recovered for cultivation. Though it has an outlet to the Danube (the Sio) its waters are brackish, in consequence of the large number of mineral springs by which it is fed. The Neusiedler See in the extreme west of Hungary is an exceedingly shallow lake, so shallow that it sometimes evaporates completely in very dry years, as it did in 1865. It is then refilled by the waters of the Danube when the river rises sufficiently high to force back the sluggish stream of the Hansag, which communicates with the Neusiedler See through the Hansag swamp.

The lakes of the Karst Region (Lake Zirknitz, etc.) have already been described (pp. 145-6).

7. *Geology.*

In the west of Austria there are two great regions of crystalline rocks, with Palæozoic and Secondary sedimentary strata, separated by a comparatively narrow belt of Tertiary and later deposits. The one of these crystalline regions is that of Bohemia, in the heart of which lie beds of Silurian, Carboniferous, and Permian rocks, and more to the north-east a considerable stretch of Cretaceous deposits, largely overlaid by those of Pleistocene age. The other great crystalline region is that of the central Alps, which here also are flanked chiefly by Palæozoic and Secondary limestones both on the north and on the south in the same way as they are farther to the west. In Austria, however, the Carboniferous and Triassic limestones are much more largely developed than in Switzerland, and more especially is that the case on the southern side of the central chain. In Tyrol, the south of Styria, Carniola, and the west of Croatia, the Triassic rocks cover wide areas, and are succeeded on the south by the Hippuritic limestones of the Cretaceous and the Nummulitic limestones of the Eocene period. In the south of Tyrol melaphyres and augite-porphyries cover a vast area, chiefly to the east of the Etsch.

The Tertiary belt between the older rocks on the north and south is narrowest about midway between Linz and Vienna, and after that the Miocene deposits begin to expand on the east, first to the north and then both to the north and south. The northern branch ascends to the Carpathians (the Western Bieskids) behind the Tatra, while the southern spreads out over all the last spurs of the Alps. The same formation surrounds the plains of

Hungary, while the mountains on the north and east are chiefly formed of Cretaceous rocks with large masses of eruptive origin, mostly trachytes and basalts. The Tatra itself is composed of granites and sedimentary rocks of Triassic age, while the highland region between it and the plain traversed by the Danube between Pressburg and Waitzen is made up of the same rocks, along with gneisses, trachytes, and basalts, till we come to the Miocene deposits on the south. On the north and east of the Carpathians there are large developments of Cretaceous and Tertiary strata continuous with those of south-western Russia. The whole of the interior of the highland region of Transylvania is filled with late Tertiary deposits, mostly in the form of soft more or less clayey sandstones. As stated in the Introduction, löss forms the superficial covering of enormous areas in the Austrian dominions, both on the highlands and in the plains of the valley of the Danube, among the Carpathians, and in the interior of Transylvania. Everywhere it forms a very fruitful soil, in some parts of the Banat attaining a depth of more than 6 feet.

8. *Minerals.*

The mineral wealth of Austria is not inferior to that of Germany, although it is far from being so fully utilised. First of all, *coal* is found in great abundance at various localities. The coalfields of the true coal-measures occur chiefly in the crystalline region, of which Bohemia is the centre. In the interior of that area there are extensive beds of coal round Pilsen and elsewhere; in Austrian Silesia another field occurs at the eastern foot of the Riesengebirge, yet another in western Cracow (Troppau), and another in the Moravian depression to the west of Olmütz. In the Carboniferous rocks on the south of the Alps there is fossil evidence to show that there also the upper members

of the series are developed, but they were laid down in a comparatively deep sea, and accordingly not under conditions suitable for the formation of coal. But by way of compensation Austria has several valuable coalfields of post-Carboniferous date. The Jurassic coals of Steyerdorf and Fünfkirchen, in Hungary, are of great economic importance. The Eocene coalfield of Häring, in Tyrol, has been worked since 1766—earlier than any of the other coalfields in the empire. In the east the coalfields of late Tertiary date in Transylvania, especially in the north of the basin at Franzensgruben, are of great importance both for that and the neighbouring provinces. Other extensive Tertiary coalfields exist between the Drave and the Save. There are, moreover, various beds of lignite or brown coal, among which may be included the *Alpenkohle* of Haidinger—a mineral intermediate between lignite and true coal, found in the Jurassic rocks of the Alps of the arch-duchy of Austria. This, however, is of more mineralogical interest than economical importance. Of greater value in this respect are the lignites of the Miocene basin on the borders of Styria and Hungary, and those of late Tertiary age which are found almost throughout the area occupied by rocks of that period in the north of Bohemia, and in recent years have been worked to a very considerable extent.

Iron ores are also widely diffused, especially in the older rocks. They are found among crystalline slates in Carinthia and in upper Hungary (the counties of Zips and Gömör), and in the Silurian rocks of Bohemia and the Alps—in Bohemia, chiefly at Krusnahora; in the Alps, at various places in lower Austria, Styria, Salzburg, and Tyrol, and, above all, in the Erzberg, in Styria, a mountain containing vast quantities of spathose ore, or carbonate of iron, and forming the richest mineral centre in all the Austrian Alps. Magnetic iron ore is found in

the Cretaceous rocks of the Carpathian region at the mines of Moranitza in the Banat.

Gold is another important mineral in the Austrian dominions. The gold-mines of the Transylvanian Erzgebirge (in the west of that province) are the richest in Europe (those of the Ural mountains being on the Asiatic side of the chain), and both the precious metals have long been worked in the neighbourhood of Schemnitz and Kremnitz, and at various other points in the Carpathians. In all these localities the precious metals occur in eruptive rocks of recent date, but they are likewise found along with lead and copper in Cretaceous rocks in old mines round Rézbánya in Hungary, while the native gold of the central gneiss of the Salzburg Alps was formerly famous. *Lead* and *silver* ores are also found associated on the Bohemian side of the Erzgebirge, and among the Silurian rocks at Przibram in Bohemia. Numerous other metals (nickel, cobalt, uranium, bismuth, etc.) are also found in the former of these two localities, and copper, cobalt, and nickel likewise occur in the mining region already mentioned in upper Hungary. *Zinc* ore is found in various places, and there are celebrated *quicksilver* mines at Idria, in the Trias of Carniola.

But the chief mineral of the Trias in Austria, as in other parts of Europe, is *salt*, the immense beds of the Salzkammergut mentioned in a previous section belonging to this member of the geological series, as do also those of Hall in Tyrol. Near Golling in Salzburg there occurs in the same strata a large bed of gypsum, probably the largest in the Alps. Salt is not, however, confined to the Trias in the Austrian dominions. Both in Transylvania and Galicia there are inexhaustible supplies of the same mineral in rocks of late Tertiary date, the masses sometimes (as at Parajd in Transylvania) lying naked at the surface. In Galicia the beds of rock-salt

and the brine-springs are distributed at intervals over an area stretching for more than 300 miles from Wieliczka, near Cracow, to Bukowina. The salt-works at Wieliczka —probably of Miocene age—are still by far the most important. The bed has a depth of upwards of 4000 feet, and the galleries belonging to the workings have a length of more than 50 miles. Near Kalusz, in Galicia, considerable quantities of potassium salts (chiefly kainite) are associated with the rock-salt.

Among other important minerals in Austria are *petroleum* and *ozokerite*, which are found in Cretaceous and Tertiary deposits in nearly the same region of Galicia as that in which rock-salt is found; *sulphur* at Radobaj in Croatia, and south-west of Wieliczka in Galicia; *asphalt* in Istria and Dalmatia; *graphite* at various places among the crystalline rocks of Austria, Moravia, and Bohemia. The *porcelain-clay* derived from the waste of the crystalline rocks in the north of Bohemia is likewise worthy of mention as having laid the foundation of an important industry; and among the *gems* obtained in Austria there is one that cannot be passed over—namely, the *noble opal*, which occurs in trachytes in the north of Hungary, near Czervenitza—a locality of peculiar interest, as being the only one where this gem is obtained by regular mining operations. The emeralds of Ober-Pinzgau in Salzburg have also a certain celebrity.[1]

9. *Climate and Vegetation.*

Two circumstances combine to give Austria a warmer climate than Germany—its more southerly situation, and the fact of its lying mainly to the south of the great

[1] Regarding the geology and minerals of Austria, see Von Hauer, *Die Geologie und ihre Anwendung auf die Kenntniss der Bodenbeschaffenheit der oesterreichisch-ungarischen Monarchie*, 2d ed., Vienna, 1878.

east-to-west mountain barrier. The effect of this barrier is particularly apparent in the west when we compare the temperatures of places situated to the north and south of the main chain of the Alps. Thus Salzburg, in lat. 47° 6′, has a mean July temperature of 63½° F., while that of Botzen (Bolzano), scarcely more than a degree farther south, has the corresponding temperature just ten degrees higher. The lowest temperature reached on an average of years at the former station is 2° F., at the latter 18°.

The extremes of temperature are likewise greater in Austria than in Germany. While at such stations as Königsberg, Bromberg, and Breslau in the east of Germany, where the range of the thermometer is on the whole greatest, the difference between the mean temperatures of January and July is from 37° to 37½° F., at Vienna the like difference is 39°, at Pest 42°, and at Botzen 40½°. Still farther south, however, we come within the equalising influences of the Mediterranean, and at Görz, a short distance from the head of the Adriatic, the difference sinks to 35½°.

Almost throughout the whole of the Austrian dominions the amount of the rainfall is greatest in summer. The principal exception is in the south-west, where autumn rains begin to predominate in the valley of the Etsch (Adige) and that of the Drave. There we begin to meet with the climatic conditions characteristic of the Mediterranean region. In the Hungarian plains the maximum rainfall occurs in the early summer months, and is followed by a remarkably dry period in the height of summer, and, as the total annual rainfall of this mountain-girt region is little above 20 inches, it is easy to understand the condition of the vegetation in the pusstas as described in the Introduction. The other mountain-girt areas of the Austrian dominions, such as

Bohemia and Transylvania, are likewise characterised by a very low annual rainfall. In the interior of Bohemia it does not exceed 18 inches (at Prague under 16 inches), while on the south-west or weather-side of the Böhmerwald, the mountains on the south-western frontier, the rainfall amounts to from 60 to 70 inches in the year, and on the same side of the Riesengebirge, the similarly situated mountains on the north-east, it again rises to nearly 40 inches. In the plains of Galicia —that is, beyond the Carpathian mountains—the total annual rainfall is from 20 to 24 inches, but there are some peculiarities connected with the rainfall of eastern Galicia which will be more appropriately considered in connection with that of the adjoining parts of Russia. The highest annual rainfall occurs in the mountainous regions in the south-west (Carniola and Carinthia), and on the Dalmatian strip (Fiume, Ragusa), in all of which places it amounts to from 60 to 65 inches per annum.[1]

On the subject of the vegetation of Austria little need be added here to what has been said elsewhere. The vegetation of the west has the same characteristics as that of the Swiss Alps; that of the south has the general aspect of that of the Mediterranean region, while the similarity of the pusstas in respect of their vegetation to the steppes of Russia has been referred to in the Introduction. It may be mentioned here, however, that in this part of the Austrian dominions there is a considerable number of endemic or peculiar species, due to the fact that these plains are isolated by their exceptional climatic conditions and by high mountain barriers, just as high mountains like the Alps and Pyrenees are isolated by lowlands. On the alpine slopes of the Carpathians

[1] As to the rainfall of the Austrian empire, see Hann, "Untersuchungen über die Regenverhältnisse von Oesterreich-Ungarn," in *Sitzungsberichte der Wiener Akad.* II. Abt., Oct. 1879 and Jan. 1880.

and the Transylvanian mountains the wealth of species is hardly less than at corresponding elevations on the Alps, notwithstanding the fact that on the northern Carpathians the area suitable for alpine plants is greatly restricted by the enormous development of the dwarf-pine or "knee-wood" of the Germans (*Pinus mughus* or *pumilio*). The same pine is also very extensively developed on the alpine heights of the Sudetes.

One of the singularities of the fauna of Austria is the occurrence of the remarkable blind amphibian called *Proteus* in the subterranean lakes of Carinthia and Carniola (the Karst Region). The eyes, though present, are covered by skin, which renders them functionless.

CHAPTER VI.

RUSSIA.

1. *Main Physical Features.*

THIS division of the continent might also be called the Sarmatian lowlands, which are themselves a direct continuation of the north German lowlands. From the banks of the Vistula and the eastern slopes of the Carpathians they stretch eastwards to the Ural Mountains and the Caspian Sea, and are bounded on the north by the Arctic Ocean, with its inlet the White Sea, on the south by the Black Sea and the Caucasian range. Through the gap between the southern extremity of the Ural range and the Caspian Sea these lowlands, which are now shown to be the bottom of a dried-up sea, are brought into direct contact with the Siberian steppes. But the whole of this enormous basin between the Carpathians and the Urals, and politically comprising European Russia, consists of a granite base, on which rests a vast covering of clay, sand, and marl, varying in thickness from 425 to 850 feet, and in places forming extremely fertile arable land, in this respect differing widely from the dried-up Asiatic plains, which consist mostly of sand, gravel, and rubble.

The physical disposition of the eastern European plains is extremely simple and monotonous. They are intersected only by the Uralo-Baltic and the Uralo-Carpathian ridges, dividing the lowlands into a northern or

Arctic, a central, and a southern or Euxine plain. Neither of these ridges attains any great elevation, and the latter, though it forms the water-parting between the rivers flowing northwards to the Volga or the Baltic and those flowing southwards to the Black Sea, is so insignificant that it can scarcely be distinguished from the plain.

In the south-east, European Russia is sometimes held to extend to the water-parting of the Caucasus Mountains; but we have already stated in the Introduction our reasons for taking the deep depression of the Manich as the limit of Europe in this quarter.

2. *The Chain of the Urals, and the other Elevations of Russia.*

The Ural Mountains range from north to south for a distance of about 1200 English miles, and the water-parting, like that of the Caucasus, forms the conventional line of division between Europe and Asia as far south as Orsk, beyond which the river Ural separates the continents as far as the north shore of the Caspian Sea. The northern end of the range lies beyond the Arctic Circle. Losing its integrity in the extreme north, the Ural chain breaks up into irregular masses, and the *Pae-Khoi Mountains,* though separated by comparatively low ground, may be regarded as a north-western offshoot from the main range. Interrupted by a narrow channel, the mountains reappear in *Waigach Island,* and are even continued on the opposite side of the Strait of Kara in the Archipelago of *Novaya Zemlya.* As far south as the Government of Perm the Ural Mountains are for the most part under and rarely above 5000 feet in height. In latitude 63° a small portion of the range rises above 5000 feet, and the same exceptional elevation occurs in latitude 59°. South of this, for a distance of about 150

THE MANYTCH DEPRESSION.

miles, the mountains are under 2000 feet in height; but again, for a space of about 80 miles, they rise to elevations above that level, beyond which to the river Ural no part of the country rises to a height of 2000 feet.

The Ural chain is conveniently divided into a Northern, a Middle, and a Southern section. In the Northern Urals, which reach to about 63° N., a point a little to the north of the source of the Petchora on the west, and some of the head-streams of the Obi on the east, where the range seems to disappear, breaking up into a number of irregular masses, the mountain called *Töll-Poss-Is* reaches an elevation of 5540 feet; in the Middle Urals, which, with their resources of copper, iron, gold, and platinum, extend to about 56° N., the culminating point is *Denejkin Kamen*, 5360 feet high; and in the Southern Urals *Mount Iremel* rises to a height of 5040 feet.

The Southern Urals do not consist of a single chain, but of three chains spreading out from a centre like a fan, the extremities of which are 180 miles apart, where they sink down to the plain above the east and west part of the course of the Ural river. It is in the westernmost of these three chains that the highest peaks occur, several, besides Mount Iremel, there attaining a greater elevation than 4000 feet.

Of the two transverse ridges of Russia the northern stretches over the water-parting between the Caspian and Arctic Sea. In the Volkonski forest and Valdai hills it attains a height of 1066 feet, and thence continues westwards to east Prussia, in this last section abounding in lakes. The southern ridge, on the other hand, rises at the southern extremity of the Urals, as the *Obshchy-Syrt*, that is, "General Elevation," extending to the Volga, and thence farther westwards to the north-eastern foot of the Carpathians.

3. *The Aralo-Caspian Depression.*

The Obshchy-Syrt stands on the edge of the great Aralo-Caspian depression, the largest in extent on the surface of the earth. The deepest part of this depression is filled by the Caspian Sea (about 170,000 square miles), the largest of all land-locked water basins, and the remains of the great inland European Sea which once extended from the Euxine to the Frozen Ocean.

The northern part of this depression, between the lower Volga and Ural, is a steppe region studded with salt lakes, and itself so largely encrusted with salt that the rivers emptying themselves into these lakes are in some cases strongly saline. The Charysacha, which feeds Lake Elton or Yelton, has 5 per cent of saline constituents in its waters, that is, nearly a half more than the water of the ocean, and is estimated to contribute to the lake into which it flows nearly 50,000,000 pounds of salt every year. From Lake Elton and the lake or marsh of Baskunchatski, nearer the Volga, hundreds of thousands of tons of salt are annually obtained; but the lakes farther to the north-east, fed by the Great and Little Uzen, are merely brackish, like the Caspian itself.

4. *Southern Russia—the Limans, The Steppes, and the Region of the Black Earth.*

The region bordering the Black Sea on the north forms a tableland of inconsiderable height, gradually descending eastwards to the mouth of the Don, sinking more abruptly northwards towards the marshes of the Pripet, while sloping more gently southwards. The coast-line, however, has in general the form of a steep cliff fringed by a narrow strip of beach. A peculiar feature of this region is the longitudinal water basins filling the

outlets of all even the smallest valleys, and known as "limans," a term taken from the Greek language, at one time prevalent in this region. These lakes, though they have all been cut off from the sea by the deposition of alluvial matter, are yet mostly fresh, but are in some cases largely charged with salt, so that their neighbourhood is specially favourable to the growth of saline plants.

As regards its botanical and general physical aspect, this vast region is divided into a northern or "black earth" region and a southern district or steppe proper. But these two regions are not strictly speaking exclusive. The black earth, *chernozem* or *chornozem*, which gives its name to one of these regions, and the origin of which was considered in the Introduction (p. 34), is a soil of remarkable fertility and of immense importance to Russia. It spreads over a large area in the southern plains south of a wavy line passing from near Kief and Chernigof in lat. 54° to the right bank of the Volga in about lat. 57°, this northern limit being the southern limit of erratic boulders marking the farthest advance of the ice of the Glacial Epoch. Its southern limit is not so clearly defined, but it does not extend over the whole area to the south. The absence of a well-defined boundary on the south causes the estimates of its extent to vary exceedingly. By some its area is placed as high as 425,000 square miles. By Ruprecht, a member of the Academy of St. Petersburg, it was estimated on the basis of official returns as equal to only about 251,000 square miles;[1] but even the lower estimate, it must be remembered, is nearly equal to three times the area of Great Britain. Possibly the smaller estimate may include only the area already reached by agriculture, for the so-called steppe zone, as distinct from the black-earth zone, includes certain portions covered by black soil, but, on account

[1] See Oscar Peschel, *Europäische Staatenkunde*, p. 144.

of the unfavourable climate or for other reasons, not yet brought to any great extent under tillage. The depth to which the black soil covers the surface varies. On an average it is from 3 to 5 feet, but in many places 20, and in some, it is said, even 60 feet.

Chemical analysis shows that it is largely composed of organic (decayed vegetable) matter, and it is this circumstance that imparts to it that extraordinary fertility which, where the climate is favourable, causes both cultivated and uncultivated products grown upon it sometimes to attain a size unparalleled in any other part of Europe. Clover, lucerne, and sainfoin, for example, may grow to the length of 15 feet; and individual stems of hemp have been met with even 20 feet in height, and that, it must be observed, in regions where there is scarcely a moderate-sized bush and not a tree to be seen.[1] The somewhat shrubby herbaceous plants of the region mostly die on the advent of summer, and their withered stems and branches, the careering of which over the arid plains form such an extraordinary and bewildering spectacle during a steppe storm, afford, under the name of *burian*, the only available fuel in the black-earth zone.

The true steppe zone stretches inland from the coast for about two parallels of latitude, but it varies greatly in breadth. It is broadest in the east, in the parts lying to the west and north-west of the Caspian. Here the vegetation is characterised chiefly by a dense growth of various kinds of stipe-bearing plants, with their acicular or prickly fronds and thyrsoid flowers so dreaded by the shepherd. Cultivation is here difficult, and is practised chiefly in the neighbourhood of the large towns. The peasants are poor, and their dwellings bespeak hardship and privation.

[1] Grisebach, *Vegetation der Erde*, i. p. 449.

Higher up the course of the streams thin oak plantations serve as a transition from the steppes to the region of the woodlands. These are everywhere skirted by oak groves, at first of small extent and disconnected, farther northwards more dense and compact. The oak forests have a rich undergrowth of brushwood and herbs of species almost exclusively common to central Europe. Besides the oak, plantations of white beech occur also on the skirts of the steppes, their density almost entirely banishing the undergrowth of copse and other vegetation. Birch, juniper, and pine do not make their appearance till we get farther north, the southern limits of the latter being marked by a line drawn through Brody, Kharkof, and Orenburg.

5. *The Crimea—Scenery of the South Coast.*

Before leaving the south of Russia we may conveniently devote a few words to the Crimea, into which the region of the southern steppes penetrates. The whole peninsula, connected with the mainland by the narrow isthmus of Perekop, which it is now proposed to pierce with a canal, is flat, with the exception of its southern shores, where we have a continuation of the Caucasus Mountains interrupted at the Strait of Yenikale, which connects the Black Sea with the Sea of Azof. In the Crimea these mountains form the romantic range of the Taurus or Yaïla, culminating with the Chatyr Dagh, 5450 feet in height, and containing other two peaks rising to above 5300 feet. The finest portions of the Crimea are traversed by the route from the famous fortress of Sebastopol to Yalta on the south-east coast. Between birch and fir trees the way winds up the hill, and then down to the Baidar valley, the sight of whose corn-fields, oaks, and walnut trees is doubly refreshing after crossing the

treeless districts about Sebastopol. Here we have huge cliffs towering one above the other; chasms and abysses, succeeded elsewhere by lines of grassy hills, smiling vales, and a luxuriant vegetation; and finally we descend on Yalta, where there are glorious stretches of woodland and glade, rare plants, and blossoms of an almost tropical richness; on the left vineyards flanked by mountain ranges, on the right the blue expanse of the sea. And such is the general character of the southern slopes of the richly-wooded mountains of the Crimea. High up the prevailing tree is the sea-pine, but on the lower levels the vegetation has an aspect seen nowhere else in Russia, the aspect which it bears in the Mediterranean peninsulas. The district between Alupka and Yalta boasts of not a few country seats of the Russian nobility. In Livadia is the villa of the empress, around which nestle a number of houses.

6. *Western Russia.*

Russian Poland, and the governments immediately to the east and north-east of it, are also remarkable for the abundance of their agricultural produce, but are not so richly favoured by the natural fertility of the soil as the tracts just spoken of. In the south-east of this region lie the extensive marshes of the Pripet, which will be referred to again in treating of the hydrography of the land.

The railway from Warsaw to St. Petersburg first crosses West Russia, or more particularly the government of Kovno, corresponding to the old Samogitia, covered partly with flax fields, but to a much greater extent with forests. Beyond it comes the government of Vilna, which in some places, especially along the Niemen, presents a more pleasant aspect. But the generally monotonous character of these lands is continued into the province of

Vitebsk, where extensive birch woods and heaths are varied by cultivated tracts. With the government of Pskof we at last enter Great Russia proper, forming the principal mass of the old empire, and the eye now rests on nothing for hours and hours together but woodlands, with here and there at long intervals a genuine Russian village—wooden hovels roofed with planks, through which the smoke struggles out as best it may. These inhospitable regions, in whose vast virgin forests the bear, the wolf, the elk, and the European bison range unmolested, stretch without change all the way to Ingermanland, the present government of St. Petersburg.

The Western Dvina and the Niemen water the marshy Lithuania, which lies between the Baltic Sea and the Rokitno swamps. Beyond, that is, to the north of the Niemen, in the so-called Baltic provinces of Kourland, Livonia, and Esthonia, the country assumes a still more fenny character, though both Kourland and Livonia are occupied to a large extent by well-wooded plateaux, with numerous headlands running out into the plains and marshes.

7. *The Lake Region.*

The north-west of Russia contains the largest lakes in our continent. The two largest of these, *Ladoga* and *Onega*, lie to the east of the Gulf of Finland; but even *Lake Ilmen*, the smaller of the two chief lakes to the south of that gulf, is half as large again as the Lake of Geneva, and the larger, *Lake Peipus*, is more than six times the size of that lake, and nearly twice as large as Lake Wetter in Sweden. The area of Lake Peipus has lately been considerably increased, in consequence of the drainage of the surrounding country having been conveyed to it more largely through the construction of 1200 miles of artificial cuttings. But though large in extent, both

Lakes Peipus and Ilmen contrast with the Swiss lakes and the lakes to the east of the Gulf of Finland in their small depth. Neither of them has a mean depth above 30 feet, while Lakes Ladoga and Onega both exceed 700 feet in depth in certain parts. The navigation of Lake Onega is much endangered by numerous reefs skirting the shores, and before buoys were placed to mark them numerous lives were lost every year in consequence of wrecks. North of these lakes there is a countless number of large and small bodies of still water, stretching along the White Sea northwards to the peninsula of Kola, and ending with the large Lake Enare in Russian Lapland, which drains through the Pasvig Elf into the Varanger Fjord. This lacustrine region is separated by a water-parting from the rocky Finnish tableland, which is also covered with several hundred lakes, comprising over one-tenth of the total area of Finland, and thus presenting a picture on a reduced scale of the great North American plateau.

The Finnish landscape is peculiarly depressing, still, almost lifeless, thinly peopled, with gloomy woods and gloomier lakes. Even under the bluest sky the water of these lakes seen from a boat appears perfectly black, although actually transparent to a depth of about 10 feet. Many of them communicate together by natural, others by artificial channels, and we may thus pass from one to another till we reach the largest of them all, *Lake Saima*, whose outflow, the Vocka, forms the Imatra rapids, which are the grandest in Europe. Lakes, rocks, pine forests—such is briefly the aspect of Finland. A few patches of fertile soil, partly reclaimed with much labour by burning down or uprooting the forests or draining off the water, here and there cover the nakedness of the land. Let us picture to ourselves a little hamlet or a single farmstead in the vicinity of these cultivated grounds, and round

about the dwelling a number of wooden huts of all sizes, for the Finn builds himself a new roof for every fresh object, whether it be a cow or perhaps only a cart; add to the picture a small but active horse, a fishing-smack rocking on the lake, or even a steam-tug with a long string of rafts or a heavily-laden barge in tow, and with these few elements we shall have little difficulty in putting together a genuine Finnish landscape. But in winter the scene changes, converted by a thick mantle of snow to the silence of death, which is broken only by an occasional passing sleigh, or the smoke curling up here and there from a solitary hut, or it may be a hare flitting over the fields, or a crow fluttering noisily from woodland to woodland.[1]

The railway from Viborg to Helsingfors has rendered necessary many cuttings through the granite of Finland, and these show that the granite base is what the French call *terrain moutonné*, that is, has been worn into rounded humps by the action of ice. Here there are no highlands in any sense of the word, and even in the south there are but few hills more than 500 feet high. The alluvial soil covering Finland, the detritus of the various granites, consists principally of a coarser or finer sand, in some places thrown up like dunes, and over the surface are scattered numerous erratic blocks or boulders.

8. *Northern Russia.*

On the north of Finland borders the inhospitable peninsula of Kola, with flat, monotonous shores, unvaried by inlets of any sort, altogether a dreary, dismal prospect. The shore facing the Arctic Ocean bears the name of the Murmanski or Lapland coast. In the south the Gulf of

[1] An instructive map of the lake region of Finland is to be found in Petermann's *Mittheilungen*, 1859, Pl. V.

Kandalaksha, one of three large bays in the White Sea, penetrates far inland. On the east side of this sea is the Gulf of Archangel, and on the south that of Onega, studded with islands, amongst which is the Solovetzki group, inhabited by a band of monks who have converted formerly unpeopled solitudes into scenes of agricultural, commercial, and industrial activity, leaving nothing to be desired of what can be obtained in such remote and inhospitable regions. At the mouth of the Northern Dvina, in the midst of a dreary waste, lies Archangel, the most important seaport in northern Russia. No less desolate is the region to the east of the White Sea, the Kanin peninsula, an icy wilderness, with the Samokovskaya Mountain, the home of the Samoyedes, the true savages of Europe, who roam from the gulf of Archangel eastwards to that of Obi in northern Asia.

Till almost as far south as the 64th parallel of latitude, the region watered by the Northern Dvina, the Mezen, and the Petchora, there stretch boundless morasses or *toundras*, where almost the only vegetation consists of the lichen, *Cladonia rangiferina*, essential to the existence of reindeer. About the 61st parallel of latitude the soil begins to be favourable for the growth of cereals, but here an enormous proportion of the surface is covered by interminable forests, consisting of larch and other species of pine, besides the willow and the apparently so delicate but really hardy birch. In the government of Vologda, the second largest in Russia, occupying nearly one-thirteenth of the entire surface, 93 per cent of the area is covered by forests.

9. *River Systems.*

The most noticeable feature of the principal river systems of Russia is their size, an inevitable consequence of

the superficial configuration. The Volga, the longest of Russian, is also the longest of European rivers. Its catchment-basin has an area at least thrice as great as the area of France, or not far short of seven times that of Great Britain; and even the catchment-basin of the Kama, its principal tributary, is equal to France in area. But the volume of their waters does not correspond with their length and the extent of the area drained by them. The largest of the Russian rivers are those which flow to the south, and of these the easternmost traverse a region where the rainfall is less than in other parts of Europe, and the loss by evaporation is relatively great. Although longer than the Danube, the Volga is estimated to discharge at its mouth less than two-thirds of the volume discharged by the former river. The mean discharge of the Ural, a river nearly twice as long as the Rhine, is only 1750 cubic feet per second, no more than that of a very insignificant stream in moister regions.

Another effect of the climate of this part of Europe on its rivers is, that on all of them the navigation is stopped by ice in winter for a longer or shorter period. Most of the Russian rivers likewise agree in having their sources in comparatively low regions amidst a labyrinth of waters, and in being liable to inundate and convert into marsh-land large areas on their banks. It has long ago been pointed out, however, that it is chiefly the left bank that is liable to be flooded, the right bank being mostly the higher and steeper of the two. Hence it is on this bank that most of the towns are to be found. On the Volga below Kazan there are said to be only four towns on the left bank of the river as against more than thirty on the right, and similar observations have been made on the Dnieper and the Don.[1]

The Volga rises at the height of only 633 feet above

[1] Peschel's *Physische Erdkunde*, ii. 386.

the level of the Caspian, or 550 feet above that of the sea, amidst a number of small lakes and marshes at the foot of low wooded hills on the Valdai plateau. It begins to be navigable not far from its source, and from the point where navigation commences its course is divisible into three parts, one reaching to Tver, navigable, with more or less difficulty, by vessels not drawing more than 2 feet of water; the second from Tver to Nijni-Novgorod, navigable for larger vessels; and the third below Nijni-Novgorod, navigable for vessels of the largest size. Altogether the Volga, with its tributaries, affords about 7200 miles of navigation. By far the most important of these tributaries are the Oka on the right, and the Kama on the left, the former memorable as having long been the frontier between the Tatars and the Slavs. Below the influx of the Kama the climate becomes so dry that the Volga receives no other considerable affluent.

Above the confluence of the Kama the region traversed by the Volga is extremely marshy. In many parts its banks are bordered by "trembling forests," supported by an upper layer of soil on a bed of mud or oozè. But in the drier region, after the river turns to the south, this sight is no longer to be seen. In the south-east of the government of Simbirsk the map shows that the Volga is deflected abruptly to the left, and surrounds three sides of a quadrangular peninsula jutting eastwards. The cause of this deflection is the presence of a limestone barrier, through which the river escapes by a breach at Samara. It is here that the most picturesque scenery in its course occurs. Its right bank is skirted by steep wooded cliffs, rising into crags, peaks, and pyramids. The delta of the Volga is usually said to begin at Tsaritsin, where the river again makes an abrupt turn and divides into two main branches, the Akhtuba and Volga proper. But the true delta, the area formed by the alluvial deposits of

the river itself, begins only a few miles above Astrakhan, about 50 miles above the embouchure in the Caspian. Here there are about 200 mouths, but most of these are shifting channels choked with mud, and after the spring floods, when the whole of the delta proper is covered with water, even the main beds become changed. Fortunately, however, the prevailing winds being from the south and south-west tend to drive the sediment constantly northwards, and hence to keep open the southernmost and principal arm of the delta. At Astrakhan navigation is stopped by ice for upwards of three months, at Kazan for about five months, in the year.

The Volga communicates by canals with the White Sea, the Baltic, and the Black Sea basins. The communication with the latter is by means of the Upa canal joining the Oka and the Don. But a more important connection with this latter river is that now effected by a railway from Tsaritsin, and it is by means of this railway that the greater part of the traffic of the Upper Volga is now conveyed seawards. At the bend of the Don, where the transfer of goods takes place, this river is free of ice for about eight months in the year. The Don itself is navigable as high as Zadonsk, about 600 miles above its mouth.

Between the Don and the Danube the Dnieper, Bug, and Dniester are now the only navigable rivers, although in the time of Herodotus there seem to have been many such. At the present day this region is so arid that all the minor streams are quite insignificant. Many of those flowing across the true steppes are like the wadies of Syria and northern Africa, flowing only during certain seasons; and many of them never reach the sea, but are absorbed in crossing the steppes. Even the Don, which is more than half as long again as the Rhine, is estimated to have a mean annual discharge of only about 8650

cubic feet per second, or not much more than a tenth of that of the latter river at the frontiers of Germany and Holland. This discharge, however, is very variable, rising greatly at the floods which take place, as in the other rivers of south Russia, at the melting of the ice and snow in spring and during the autumn rains.

The Dnieper rises in the low-lying region in which are found also some of the head streams of the Western Dvina, the Volga, and the Oka, and the upper part of its course traverses, like that of the Volga, a region of trembling forests and morasses. It is navigable almost from its source, and it is almost doubled in size on receiving the Pripet on its right bank. This affluent, before joining the Dnieper, crosses a marsh known as the Pinsk Marsh, embracing an area of about 35,000 square miles, which formerly yielded no valuable products. Surveys made in 1873, however, proved that this land could be drained into the Dnieper, and since then works for the purpose have been so energetically carried on by the Russian Government that these marshes promise soon to be a thing of the past. At more than one point below the influx of the Pripet the navigation of the Dnieper is greatly impeded by rapids. Above Kremenchug the river falls over 65 feet in 10 miles, and below Yekaterinoslaf occur the *porogi* or ledges, where in the course of 46 miles the river falls 157 feet, contracting at the Wolf Gorge, near the lower end of these rapids, to 520 feet in width. They are navigable only for small craft during eight weeks in the year at the time of the spring floods. Larger vessels are compelled to unload at Alexandrovsk below, and Yekaterinoslaf above. And even this is not the last hindrance to navigation, for constant dredging is required at the mouth to keep the channel open. At Kherson the river is ice-bound for nearly three months. Works are now in progress for

the removal of the cataracts on the Dnieper, and it is expected that the course of the navigation will not be impeded through this cause more than three or four years longer.

The Dniester and the Bug likewise have the lower part of their course impeded by rapids, and the former has a bar at its mouth which admits only of light craft ascending the river. The Dniester is the first of the rivers yet mentioned which has its sources beyond the frontier of Russia. It rises on the Galician slopes of the Carpathians, and has its right bank skirted by offsets from that chain till it reaches the Russian boundary.

Of the Russian rivers draining into the Baltic the most important are the Vistula, the Niemen, and the Western Dvina, besides the Neva, the short but wide and deep river that drains Lake Ladoga. They are all navigable streams, but the navigation of the Western Dvina is greatly impeded by shallows, and is hence very dangerous except at the time of the spring floods. For large craft the Vistula is navigable from the confluence of the San and the Niemen (German *Memel*) from Grodno. In draining Lake Ladoga the Neva drains also a large basin to which Lakes Onega and Ilmen also belong, and hence this river ranks among the foremost of the rivers of Europe in respect of the volume of its waters. Nevertheless it is navigable for large vessels only as high as the head of the delta at St. Petersburg. Between the quays at that city there is a depth of from 20 to 50 feet, but above the point mentioned we meet here also with *porogi*, which do not admit of the ascent of vessels drawing more than 7 feet of water. On an average of 150 years it was found that the Neva is ice-bound for 138 days annually. Within that time the shortest period for which the harbour of St. Petersburg was closed

by ice was 87 days in 1822, the longest 194 days in 1852.

Of the northern rivers the only ones important for navigation are the Northern Dvina and the Petchora. The former becomes navigable on receiving the Vichegda, where it turns to the north; but though at Archangel the river has a depth varying with the season from 40 to 70 feet, yet large vessels cannot ascend it on account of the shoals at its mouth. The mouth of the Petchora is likewise encumbered by a bar with only 12 feet of water above it, and its delta is free from ice on an average for only 127 days in the year; but nevertheless the traffic in timber, cereals, and furs carried on by means of it is very considerable. The Northern Dvina, it may be mentioned, has a kind of cod, called *navaga*, absolutely peculiar to it.

10. *Geology.*

In consequence of the large scale on which the geological formations entering into the constitution of Russia are developed, it is easy to discern the geological structure of that vast country by merely inspecting the geological map of Europe. It will be observed that all central and northern Russia may be conceived as forming a vast synclinal trough lying between the Archæan rocks of Finland, Lapland, and Scandinavia on the west, and the granites and crystalline schists of the Urals in the east. In that trough have been laid down in succession Silurian, Devonian, Carboniferous, Permian, and Jurassic deposits, the last forming a great wedge running down from the Arctic Ocean to the heart of Russia, but divided into two patches in the north by strips of Devonian and Carboniferous age, which mark the division of the great trough into two secondary ones. All the strata above

mentioned below the Jurassic appear on both sides of the great trough, but all except the Permian are much more extensively developed on the west than on the east, where they merely form thin strips running parallel with the Ural Mountains, while the Permian, which takes its name from the government of Perm, is the most largely developed of all the Russian rocks, especially in the east. South of this great trough there are a few outliers of these older strata, the most important being a large one of Carboniferous date north of the Sea of Azof, where the chief Russian coalfields occur. Elsewhere the Russian plains on the south, together with the kingdom of Roumania, are mainly composed of rocks of post-Jurassic date, from the Cretaceous upwards; but it must be noticed that the granitic base of this vast country is uncovered by sedimentary rocks throughout a broad belt, stretching from the vicinity of the north-west coast of the Sea of Azof north-westwards to the Pinsk Marsh, in about lat. 52° N. It has been already mentioned in the Introduction (p. 34) that the soil of the greater part of southern Russia (the black earth) is of more recent geological date than the rocks that crop up immediately beneath it.[1]

11. *Minerals.*

The minerals of Russia, and especially the metallic ores, are of great value. Notwithstanding the wide distribution of the Carboniferous rocks, and even of the upper members of the series to which the coal-measures belong, *coal* does not take a high place among the mineral products of the country. Besides the basin just referred to north of the Sea of Azof, known as the Donetz basin, from the fact of its being traversed by that

[1] For details of the geology of Russia, see Murchison's classical work.

tributary of the Don, there are other beds of coal among the Valdai Hills and in the government of Moscow; but the coal in both of these districts is poor in quality, and in the former obtainable only in very thin seams. On the other hand, *gold*, *iron*, and *copper* are all found in great abundance. Gold is obtained both by mining and washing at various localities on the east side of the Ural Mountains. The precious metal has also been obtained of late years from the tributaries of the Tana in Russian Lapland. Iron is very widely diffused, both among the mountains on the east, where there exist four large mountains consisting almost entirely of magnetic iron ore, and in the plains, where even the marshes contain large beds of bog iron ore. Copper is distributed over almost the whole of the government of Perm, both in the low country and in the Ural Mountains, and is likewise found in the Valdai Hills, as well as in other parts of European Russia. *Platinum* is also an important metallic product of Russia, the most productive mines of that metal known to exist in the world being situated in the chain of the Urals. It is found, as nuggets and scales, in the alluvial deposits of the valleys, and was formerly used in the Russian coinage. In the same chain of mountains *lead ore* occurs, as it does also in some parts of Poland, especially near Cracow and Sandomir, though nowhere in sufficient quantity to give it a high place among the mineral products. *Salt* and *saltpetre* are found in the saline steppes of the south-east, described in a previous section (p. 168), and excellent granites and marbles are obtained on the shores and in the region to the north-east of Lake Ladoga. Large quantities of *graphite* are obtained along with ores of iron in the mines of Kriwoi Rog in the south of Russia. The *naphtha* springs of the Apsheron peninsula lie outside of the boundary adopted in this volume for Europe on the south-east. (See ASIA, p. 362.)

12. *Climate, Fauna.*

In the Introduction attention has already been drawn to the extremes of temperature that characterise the climate of eastern Europe, and to the fact that, in consequence of the absence of the shelter of a mountain-barrier running across the country from east to west as in the rest of Europe, severe winters extend even to the Black Sea shores. The following figures will serve to illustrate these facts, and it may be mentioned that Sebastopol, which, be it observed, lies in a lower latitude than Genoa or Bordeaux, is the only station in European Russia (excluding Caucasia) where observations extended over a considerable series of years, exhibit a mean January temperature above the freezing-point.

N. Lat.	E. Lon.	Place.	Mean min. of whole year.	Mean max. of whole year.	Mean Annual range.	Mean temperature.		
						Jan.	July.	Year.
			Fahr.	Fahr.	Fahr.	Fahr.	Fahr.	Fahr.
64° 6′	40° 5′	Archangel . .	32°	84½°	116½°	7½°	60½°	33°
60° 2′	25° 0′	Helsingfors .	17°	80°	97°	19°	61½°	39°
59° 9′	30° 3′	St. Petersburg	19½°	84½°	104°	14½°	64°	38½°
55° 8′	37° 7′	Moscow . . .	23°	88½°	111½°	12°	66°	39°
52° 2′	21° 0′	Warsaw . . .	8°	89½°	97½°	24°	65½°	45°
46° 5′	30° 7′	Odessa . . .	...	...	...	27°	73°	49°
46° 3′	48° 0′	Astrakhan . .	15°	97½°	112½°	19°	78°	49°
44° 6′	33° 5′	Sebastopol. .	10°	83°	73°	35½°	74°	54°

The variability of temperature illustrated by the wide ranges indicated is not merely a phenomenon characteristic of the annual course of the seasons, but every month of the year shows a wide range of temperature, and above all in the region round the White Sea and in the remote east. Towards the west this mean variability of the monthly temperatures rapidly declines.[1] In the

[1] See H. Wild, "Temperaturverhältnisse des russischen Reiches," an abstract of which, with maps, is given in Petermann's *Mittheilungen*, 1881, p. 281.

steppes terrible storms frequently rage in winter for days together, burying everything under the masses of snow and myriads of ice-needles whirled along by the wind.

The rain-chart of Europe shows how small the total annual rainfall is in the greater part of Russia, and more particularly in the south; but it is important to remember that throughout almost the entire area the rains fall principally in the summer, that is, exactly at the period of the year when they are most needed to make up for the loss by evaporation. Small as the rainfall is it is sufficient to make agriculture and gardening possible without irrigation in all southern Russia, except in the extreme east, and the rich soil of this region has long made it a granary for other parts of Europe, and has for years past been attracting a larger and larger population from the more sterile fields in the north. While summer rains prevail over the greater part of the area, this is especially true of the extreme south-west, with the adjoining plains of Moldavia, Galicia, and Bukowina. At Lemberg, Czernowitz, and Kishinef there fall in the month of June from three to four inches of rain as against from half an inch to an inch and a half in the month of October. This is mainly due to the fact that north-west winds then bring great quantities of moisture from the Atlantic. Even at Jassy in Moldavia such a wind will sometimes bring rains lasting for twenty-four hours together.[1] In the south-east, on the contrary, the conditions are exactly opposite. Even at Astrakhan agriculture cannot be pursued without irrigation, and throughout the area of the Caspian depression-basin the rainfall is extremely scanty and very irregular in its occurrence, so that the whole tract is little better than a desert affording a meagre support to a few nomadic tribes, and presenting

[1] Woeikof, *Die atmosphärische Circulation*, p. 15.

a complete contrast to the rich agricultural land lying immediately to the west.

The general aspect of the vegetation of Russia has been noticed in the previous sections, and its affinities were alluded to in the Introduction (p. 46).

Of the more noteworthy members of the Russian fauna, the larger musk-rat or desman, the mole-rat (*Spalax*), and the saiga or large-nosed antelope, have all been already mentioned in the opening chapter as highly characteristic of the northern division of the Palæarctic region generally; but in addition to these we may notice another inhabitant of southern Russia, the *bobak* or Russian marmot, whose nearest ally is the marmot of the Alps; while the only other member of the genus, singular to say, is a native of the Rocky Mountains. The bobak, which burrows beneath the Russian steppes, is thus the only inhabitant of the plains belonging to the genus. In the north the sable and various other fur-bearing animals form an important source of revenue to the people. The wild inhabitants of the forests have already been alluded to in a previous section (p. 173), but the forests of the mountains of the Crimea present some peculiarities worthy of notice with regard to the members of their fauna. In the Crimea generally, the mammals are remarkably few in number, and the forests of the south of that peninsula do not possess either the squirrel, the lynx, or the wild-cat, while the mammals by which they are inhabited, as the stag, the roe-deer, and the pine-marten, belong to varieties found in the Caucasus, but not in the forests of northern Russia, which are separated from those of the Crimea by treeless plains incapable of being crossed by such denizens of the wood as those mentioned. There can be little doubt, therefore, that the Crimean forests have derived these and several other members of their fauna from the Caucasus, and it has been suggested

that the animals so derived are only such as could cross the Strait of Yenikale when completely frozen over, as is sometimes the case.[1]

[1] See Tr. Th. Köppen: "Das Fehlen des Eichhörnchens und das Vorhandensein des Rehs und des Edelhirsches in der Krim," St. Petersburg, 1882 (a separate reprint from the *Beiträge zur Kenntniss des russischen Reiches*).

CHAPTER VII.

SCANDINAVIA AND ICELAND.

1. *Outline and Extent.*

THE Scandinavian peninsula stretches from north-east to south-west through about twenty-six degrees of longitude and sixteen degrees of latitude, upwards of six of which are within the Arctic Circle. The first glance at a map of the peninsula will reveal the fact that the coast-line is at almost all parts extremely tortuous, and bordered by larger or smaller islands. But while the west and east coasts seem to correspond in this respect, there is in reality a great contrast between them. Even the map shows that the sinuosities on the east side are, as a rule, much more minute than those on the west, and that the islands on that side are nearly all small, while those lying off the west coast are of all sizes, from mere rocks, often of very fantastic form, up to islands three or four times the size of the island of Anglesey. And yet the map gives but little idea of the contrast that actually exists between the eastern and western coasts. On the west the coasts both of the islands and of the mainland are generally rocky and precipitous, especially towards the north, and the deep indentations penetrating far into the land, often with a sinuous course, are rock-bound fiords. Even the west coast of Sweden, that which faces the Kattegat, is generally rocky, though here it is not high, seldom rising higher than 30 feet. The east coast, on

the other hand, presents a succession of low shores and cliffs of no great height. In the upper part of the Gulf of Bothnia the coast consists entirely of alluvial deposits, brought down by the numerous rapid rivers from the Scandinavian mountains, and the tortuousness of its outline is due solely to the irregularity with which these deposits are laid down. The growth of the land in this quarter is assisted by the fact that the coast is here rising, which is indeed the case with the whole of the Scandinavian coast, except the portion on the extreme south-west, which has long been known to be sinking.

From Christiania round Cape Lindesnaes, or the Naes, as far as Stavanger, the fiords are comparatively small, the Lyse Fjord alone, at the last-named seaport, penetrating to any distance inland. But from this point northwards the coast seems literally rent asunder; and, as on the west coast of Scotland, fringed with countless islands and cliffs, the so-called *skjaers*, which must all be alike regarded as disruptured fragments of the mainland. In the south of Norway the most important fiords are the Hardanger and Sogne Fjords, whose rugged steep sides often sink to a considerable depth below the surface. As we proceed northwards they seem to increase in size, especially beyond the Arctic Circle, which intersects the Scandinavian peninsula. Here the islands and skjaers stretch to a distance of more than 30 miles from the mainland, forming a vast number of reefs and shoals, against which the sea breaks, producing in stormy weather a prodigious extent of seething surf, with small patches of still water between.

About the 68th parallel begins a larger group of hilly islands, the Lofoden group, where the valuable cod fisheries are carried on along a bank of varying breadth skirting this coast. Here also, between Mosken and Moskenäsö, in the Lofoden group, is situated the famous

Malström or Moskenström, a whirlpool, particularly dangerous during the prevalence of north-westerly gales.

Amongst the more northern fiords, those of Lyngen, Kvenang, Alten, Porsanger, Laxe, and Tana, are distinguished by their great size and breadth. On the island of Magerö, at the western outlet of the Porsanger Fjord, stands the precipitous bluff of North Cape, rising to a height of 1010 feet.

2. *Relief of the Land.*

The Scandinavian mountains trend south-westerly from the head of the Varanger Fjord, east of the North Cape, to the Naze and Christiansand, at the entrance to the Skager-rack. Their length is over 1200 miles, and their average breadth, including all the country above 500 feet, is over 200 miles. It must be borne in mind that the Scandinavian chain does not form a continuous range, but consists of a succession of plateaux and detached mountains rising from an elevated base. Intersecting valleys, mostly deep and narrow, constantly break the continuity of these plateaux, dividing them up more or less into vast tabular masses. Most of these are covered with snow-fields and glaciers, whence the groups of mountains themselves have come to be called "fields" (*fjeldene*).

Approximately the water-parting divides Norway and Sweden, excepting on the south, for the Dovre Fjeld, and the mountains from thence towards the Naze are situated in Norway, and in these regions, as a general rule, they attain their greatest elevation. Throughout by far the greater part of their course the mountains rarely exceed 5000 feet in height, but on and south of the Dovre Fjeld there are at least thirteen points which exceed that elevation, while farther north there are very few. The

highest point of the Scandinavian peninsula is an elevation of 8550 feet in the *Jötunfjelde* or "Giants' Mountains." The northern part of the Norwegian chain is known as the *Kjölen*, and here the culminating point is *Sulitjelma*, at an elevation of 6178 feet. The general elevation of the northern plateaux is from 1600 to 2100 feet, of the southern from 2600 to 3700 feet.

It is notable that the water-parting of the Scandinavian peninsula is much nearer to the Atlantic Ocean than it is to the Baltic Sea and the Gulf of Bothnia, and hence all the larger rivers of the Peninsula flow into the Baltic, the Kattegat, and the Skager-rack, excepting the Tana, the Pasvig, and the Kola, which find their way through comparatively low lands to the Arctic Ocean. As a consequence of this physical structure, it follows that Norway is essentially a mountainous country, while Sweden is characterised not so much by mountains as by extensive plains which, starting from the highlands of the interior, slope more or less gently towards the Baltic and the Gulf of Bothnia.

No European highlands surpass those of Scandinavia in terrific and savage grandeur. Like the Alps they are rent and torn, full of fearful chasms and deep gorges, abounding in mountain lakes embedded in vertical rocky walls, and impetuous torrents and rivers often forming enormous waterfalls. The hills are strewn with scattered fragments of disintegrated rock and filled with mighty glaciers; nor are avalanches wanting to complete the picture. But as the narrow and deep furrows forming the valleys are lost in the vast breadth of the whole mountain mass, the Scandinavian highlands produce a very different impression from that of upland regions such as the Alps, where the chief space is occupied by the valleys. Ascending from the river valley or from the fiord, the Norwegian looks round and beholds nothing but

a prodigious expanse of heath and moorland stretching as far as the eye can reach in all directions. The Norse *höidar*, like the English *heath*, meant originally nothing more than a broad, treeless waste. But as such open plains occur in Norway only in the higher regions, the conception has been gradually transferred from the one to the other, and *höidar* now means not only the upland wastes themselves, but also crest-like formations, and even a mountain in general. But "to hie over the heath," also means, in Norway, to cross the heights, whenever these rise above the tree line. When the hills fall short of this limit the word used is *skogen* or *wood*, and when the bare treeless uplands assume considerable dimensions they are called *vidderne* or *broad lands*. To form a faint idea of the terrors that here await the wayfarer, and often suddenly fall upon him, one must have wandered for days together along these highland tracks, or at least have read the graphic descriptions of journeys "over the heath." In the eastern districts of Norway, a trip across the mountains is spoken of as going *over Kjölen*, that is "over the keel," whence the origin of the term "Kjölen" applied to the pretended mountain range between Norway and Sweden.

But what more than aught else strikes the imagination in Scandinavia is the colossal scale of its horizontal dimensions, a fact which we are apt to overlook from the cause already referred to in treating of Switzerland — the relatively small scale on which it is usually represented. With an area five times as great as that of England, and more than eighteen times as great as that of Switzerland, we often see the Scandinavian peninsula represented on maps of the same size as these other countries. The central European Alpine range has a sweep of 740 miles from the Riviera di Ponente on the Mediterranean to the level of the

Danube at Vienna. But the western edge of the Scandinavian highlands stretches for a distance of about 1140 miles from the Naze to North Cape, while their total area amounts to 202,000 square miles, that is, some 21,000 square miles more than Alps, Apennines, and Pyrenees all taken together. The Sogne Fjord penetrates into the interior of the Scandinavian highlands for upwards of 100 miles, that is to say, about as far as say from Munich to Heidelberg, or Innsbruck to Verona. The Gudbrandsdal again, from beginning to end simply a mountain valley, crosses more than three and a half parallels of latitude in its main direction south-east and north-west, and with it may be profitably compared the length of the Inn or Rhone valley, so far as they form part of the Alpine region.

3. *Hydrography.*

The highland region of Scandinavia is plentifully studded with lakes which send down, east and west, numerous streams or "elvs" to the sea. These can, of course, develop into large rivers on the east side alone, and are, properly speaking, rather a string of lakes connected together by means of short rapids often assuming the aspect of large waterfalls. That these watercourses are developed more rapidly on the west side, where the declivities are relatively much more abrupt, is natural enough. Hence on the Norwegian side the whole volume of water often rushes in one gigantic and unbroken fall down a precipice some hundreds of yards high. Here are accordingly found those stupendous cascades, far surpassing those of the Alps in grandeur and volume of water. Nowhere else in Europe do we meet with cataracts of such colossal proportions as the Ringedals and Vörings Fos (that is "force," as used in the North of

England), the Hardanger, and, above all, the glorious Rjukan Fos, or "Reeking Force," in Telemarken, whose waters seem to be dissipated in a vast cloud of vapour. The well-known Falls of Trollhätten, on the river Gotha, near Wenersborg, in the south of Sweden, form a cataract of 112 feet in height.

THE FALLS OF TROLLHÄTTEN.

All the rivers of Scandinavia are remarkable for their great volume of water in proportion to their length and the area they drain. This is partly due to the great amount of the rainfall, but partly also to the nature of their beds, which are almost always hard rocks not allowing much absorption; partly likewise to the circumstance

that in these latitudes there is little loss by evaporation. The largest of the Scandinavian rivers is the Glommen, which flows for the most part in a southerly direction, as if it were going to enter Lake Wener, but at the town of Kongsvinger makes a sharp bend to the south-west and enters the head of Christiania Fjord. Formerly the nearly southerly direction was maintained throughout its whole course till the river actually flowed into the lake for which, in its upper part, it appears to be making. But while Lake Wener has thus lost one feeder, it now derives a much more abundant supply of water than formerly from another; for Lake Fæmund, which is now drained by the Klar-Elv into this other lake, was formerly drained by the Dal-Elv into the Gulf of Bothnia. It is principally the large tribute that is borne by the Klar-Elv to Lake Wener that causes the Göta, the outlet of that lake, to rank next after the Glommen in respect of its volume of water. The rivers of Sweden, north of the estuary of Dal-Elv, have all much the same character. As the map shows, they all, or nearly all, maintain a general parallelism in their course to the Gulf of Bothnia. They are all approximately equal in length, in the area of their basin, and in the quantity of water discharged by them (about 70,000 cubic feet per second).[1] Finally, as already indicated, they are all provided with lakes which admirably fulfil the function of regulators, their level rising from three to twelve feet during flood—at the melting of the snows in April and May, and again during the autumn rains.

The principal lakes of Scandinavia are those in the south of Sweden. In that district lie the largest lakes in Europe, except those of Russia. Lake Wener, with an area of 2408 square miles, is more than nine times as large as the Lake of Geneva, though not one-third of the size of Lake Ladoga. Lakes Wetter and Mälar are the

[1] Reclus.

next in size, and even the smaller of these is more than twice as large as the Lake of Geneva.

4. *Geology.*

The most striking peculiarity in the geological structure of Scandinavia is that the peninsula is composed in the main of crystalline rocks, which are extensively overlaid by deposits of Quaternary age. Some intermediate strata are developed here and there, but only to a relatively small extent. The Archæan rocks are chiefly made up of gneisses, red and gray, alternating with schistose formations, containing bands of limestone and quartzite, and intermingled with granites of different ages. A smaller area of these primitive formations consists of a series of rocks of more compact structure known as hälleflintas, which seem to be of later date than the preceding; and these latter rocks, although insignificant in respect of their development as compared with the former, are of great importance inasmuch as they contain the principal ores of iron, copper, and zinc. Among the granites, the coarse variety known as pegmatite occurs here and there in veins, and in some places this is worked for the sake of the felspar it contains. Besides granites, Scandinavia possesses, among other eruptive rocks, porphyrites, diorites, gabbros, diabases, and basalts. The first of these have a great extent in the Swedish province of Dalecarlia, and are well known from their use in the arts. The basalts are confined to Skanör (Scania) in the south-west of Sweden, and the others are scattered here and there in different places.

The Archæan rocks of Scandinavia are followed by those of Cambrian age in parts of central and northern Norway, and in various parts of Sweden; but these are not only of small extent, but of very slight thickness in

comparison with the corresponding rocks in the British Isles. The Silurian strata are more extensively developed in Scania, in West Gotland between Lakes Wener and Wetter, in Dalecarlia, Jemtland, and other parts of the mainland, as well as on the islands of Gotland and Oland. A vast area of the metamorphic region is composed of crystalline schists, the Silurian age of which seems recently to have been demonstrated. The structure of the Scottish Highlands probably finds a close parallel in that of parts of the Scandinavian peninsula. The Silurian rocks of the south present, however, a great contrast to these in being on the whole free from violent folding, crumpling, and metamorphism, and in many places nearly as horizontal in their position and as soft in structure as when first laid down.

Rocks probably of Old Red Sandstone age occur in western and northern Norway, but having as yet yielded no fossils, are believed to be of that date solely on account of their correspondence in structure and in the mode of their occurrence to the Old Red Sandstone of Scotland. The other pre-glacial deposits of Scandinavia are confined to the south-west of Sweden, where small patches of Jurassic and Cretaceous rocks occur; the former interesting as containing the only beds of coal in the peninsula. Finally, the Quaternary deposits are either glacial or post-glacial, the most ancient being an angular gravel chiefly representing the bottom moraine of the vast ice-sheet which once covered this part of Europe. In certain places these are overlaid by marine deposits indicating where the peninsula has since been submerged—in the north to a depth of 500 or 600 feet, in the south no more than 100 feet. Among the most characteristic of the Quaternary deposits of Scandinavia are the long ridges known as *Åsar*, composed of stratified sand and gravel mingled with rolled and polished pebbles. They usually

stretch from north to south, and attain in some cases a length of from 150 to 200 miles (see Introduction). The post-glacial formations of Scandinavia are either moraine clays, or fluviatile or other fresh-water deposits, among which the peat-bogs are the most interesting and important.

5. *Minerals.*

Of the minerals of Scandinavia, by far the most important is *iron*, the ores of which are of great value, but are mostly confined to Sweden. They are chiefly rich magnetic and hæmatitic ores, yielding, when smelted with charcoal, splendid iron for conversion into steel. Next in importance in Sweden are the ores of *copper* and *zinc*, and of still less value are those of *silver* and *lead*, *nickel*, *pyrites*, *manganese*, *cobalt*, and *graphite*. The area over which these minerals are distributed is of very limited extent. There are two principal mineral districts, one in the south and the other in the north. The former, situated between Lake Wener and the Gulf of Bothnia, and extending over less than 5000 square miles, comprises all the principal mineral wealth of Sweden, both in iron and in other ores. Here occur the iron-mines of Norberg, Dannemora, Perseberg, etc.; the copper mines of Falun, the lead and silver mines of Sala (near Norberg), and the zinc-mines of Ammeberg (at the north end of Lake Wetter). In the north the Swedish ores are almost confined to North Bothnia, where immense masses of iron ore occur at Gellivara, Kircurnavara, Luossavara, Svappavara, and other places; but all, unfortunately, in situations where the difficulty of establishing communications presents a great impediment to their working. In the province of Jemtland there are deposits of copper, chiefly near the frontier of Norway.[1] *Coal* of Upper Triassic or Rhætic age

[1] See *L'Industrie minière de la Suède*, by G. Nordenström. 1883.

occurs near Helsingborg in Scania, where it forms the three coalfields of Hoganas, Stabbarp, and Roddinge. At Hoganas one of the coal-seams measures 4½ feet in thickness.

In Norway itself the mineral wealth is not great. Besides the silver mines of Kongsberg, which have been worked almost without interruption since their discovery in 1623, and the copper-mines of Bratsberg, there are none of any importance; but gold has recently been discovered in the alluvial detritus of the Tana and other rivers of Finmark, and it also occurs, in quartz, at Eidsvold, as well as with silver in the Kongsberg mines. There are also in Norway iron-mines, and workings for nickeliferous pyrites. *Apatite,* or crystalline phosphate of lime, is worked near Arendal.

6. *Climate and Vegetation.*

The climatic conditions of the Scandinavian peninsula are interesting in many ways. In the first place, as stated in the opening chapter, the west coast affords the best illustration on the face of the globe of the moderating influence of equatorial currents and winds upon the temperature. It is in consequence of this that the fiords even in the extreme north of Norway remain free of ice all the year round, while the ports on the Baltic are annually closed by ice for a longer or shorter period. To the south of 65° N. the most westerly stations have not as a rule any days in which the mean temperature sinks below the freezing point even of fresh water. Fruholm, in 71° 6′ N., the most northerly meteorological station in the peninsula, has the temperature of its coldest month (February) even higher than that of Christiania at the head of the Christiania Fiord, more than eleven degrees farther south —23½° as against 23° F. The contrast between the

west and east coasts of the peninsula is clearly shown by the following figures, giving the mean winter temperatures at three stations in equal latitudes on both sides :—

Lat.	West.		East.	
62°.	Aalesund .	35½° F.	Hernosund .	20° F.
60°.	Bergen .	33½°.	Gefle . .	24°.
59°.	Skudesnæs .	35°.	Stockholm . .	26½°.

The lower temperatures at the more southerly stations on the west side are no doubt due to the interference of North Britain with the direct course of the equatorial currents.

The effect on the rainfall of the exposure of the steep western edge of the Scandinavian plateau to the warm moisture-laden south-westerly winds is shown with sufficient clearness by the rain-chart of Europe, and need not be further enlarged on.

The distribution of the vegetation in the peninsula affords further interesting illustrations of the peculiar climatic conditions that obtain here. The high latitudes at which trees are found, and the cultivation of cereals may be carried on, testify to the exceptionally moderate temperatures of these northerly climes. Even at Hammerfest, in lat. 70½° N., the birch attains the height of 800 feet above sea-level; on Sulitjelma, in lat. 67°, it rises to 1100 feet; in Finmarken, in lat. 69°, the pine ascends to 1020 feet; and on Hardanger Field, in lat. 60°, even the ash to 1200 feet. The cultivation of oats, the principal corn-crop of Norway, extends as high as 68° N.; that of barley as high as 70°. The case of barley is specially noteworthy, inasmuch as that crop has exhibited a peculiar adaptability to different climatic conditions, having developed varieties ripening within a remarkably short period in accordance with the varying conditions prevailing in the country at various latitudes and altitudes. Within the short distance

separating Hardanger from Bergen Grisebach found the period of vegetation for that crop to vary from 71 to 140 days, and he observed that in the manner in which the shortening of the period is brought about, we may see an effect of the long summer days which Norway enjoys in virtue of its high latitude. The process of growth which is accomplished in certain cases with unusual rapidity, is that between germination and the formation of the ear; that is, the period when the crop is green, and when the green parts accordingly are enabled to carry on their function under the influence of light during a great part of every day. The interval between the formation of the ear and the ripening of the grain is as long in Norway as it is in Saxony.[1]

A noteworthy circumstance connected with the distribution of forest trees in Scandinavia is that the limit of different trees rises higher on the east than on the west side of the mountains, even though, as we have seen, the former is the side on which the cold is greatest. The birch and the pine rise several hundred feet higher on the Swedish side of the mountains than they do at corresponding latitudes on the Norwegian side. But this too is a natural consequence of the physical geography of the peninsula; for though in winter the east is indeed colder than the west, it must be remembered that all the year round the precipitation is much greater on the west than on the east. That means that on the western slopes the accumulations of snow in winter are much greater than on the eastern, while in summer and autumn the prevalence of rainy and cloudy weather keeps down the temperature, and thus retards the melting of the snow. Hence the lowering of the snow-line, and with it of the tree-line, on the side where that occurs. In the case of fruit-trees, which do not ascend high on the mountain

[1] Grisebach, *Vegetation der Erde*, i. 121.

sides, Norway retains the advantage which it has over Sweden, as well as over all the rest of Europe. The apple and pear ripen in Norway in as high a latitude as 65° 10′; the cherry is found even at lat. 66°, while in Sweden the limit for all these trees descends to 61°, and runs thence south-eastwards through Russia to Kazan, in lat. 56° N.

The alpine region in Scandinavia, the region, namely, between the tree and the snow line, is found only on the broad tablelands in the south. It has little of the floral luxuriance of the corresponding region of the mountains of central Europe, the surface being covered only with a thin soil, bearing little beyond a variegated but dull-tinted carpet of mosses (*Cladonia*, or reindeer moss, and *Cetraria*). As in the Alps this region begins with a zone of rhododendrons and dwarf-pines, so in Scandinavia it is ushered in by a zone of dwarf-birches. The ascent of the mountains is everywhere accompanied by a steady decrease in the size of the willows, until on the highest summits of the fjeldene the only companion of the cryptogamic vegetation is the minute herbaceous willow, the total height of which, including the roots, is only about one inch, or less. The character of the vegetation on these Scandinavian plateaux renders them for the most part unsuited for summer pastures like those of the alpine heights of central Europe. One may walk over them for miles and miles together without coming in sight of a single herdsman's hut to remind one of the numberless chalets of the Alps.

The fauna of Scandinavia is that of northern regions generally, but the remarkable rodent called the *lemming* may be mentioned as characteristic. This animal migrates from time to time from the interior towards the Baltic or the Gulf of Bothnia in enormous troops, always pursuing a straight line across mountains and valleys, lakes and

rivers. Among the characteristic birds of the region beyond 70° N. are two species of falcon (*Falco gyrfalco* and *F. peregrinus*), and the rough-legged buzzard (*Archibuteo lagopus*), all of which are tolerably abundant. The snow-bunting (*Plectrophanes nivalis*) is the only permanent resident in East Finmarken north of the limit mentioned.[1]

7. *Iceland.*

The Arctic Circle cuts the extreme northern point of the large island of Iceland, which is less than 250 miles distant from the thoroughly Arctic region of Greenland. It is more than one-third larger than Scotland, having an area of 39,566 square miles.

This island is to be regarded mainly as a volcanic mountainous region, treeless and full of fearful wastes, rugged cliffs, lofty ice- and snow-clad crests, numerous glaciers, or rather glaciated and snow-clad mountains and plateaux (the so-called Jökulls), rapid torrents, and small but deep crater lakes. It forms an arid tableland ascending from the south-west to the north-east, at a mean elevation of 1000 to 2100 feet above the sea level, and presenting, especially in the north and north-west, a steep coast-line indented by deep fiords. The north-western corner, in fact, forms a triangular peninsula connected with the mainland only by means of a very narrow neck of land.

Here also the climate is far milder than might be supposed from its high latitude. And the opinion that it has deteriorated since mediæval times, becoming more rigorous since the island has been deprived of its woods, is emphatically denied by Konrad Maurer. The summers, as in 1871, are even now occasionally very hot, and winter, as in 1874-75, remarkably mild.

[1] Wallace's *Distribution of Animals*, vol. i. chap. x.

Amongst the glacier mountains of the interior there are upwards of twenty active volcanoes, amongst which the most noted are Hecla (5095 feet) in the south, and the Vatna Jökull in the south-east. The latter is rather a large tableland than a mountain, and at its southern angle stands Oräfa Jökull, the culminating peak of Iceland (6410 feet). In March 1875 the Vatna Jökull was the scene of a prodigious eruption of sulphur and cinders, on which occasion the ashes were wafted over the sea as far as Scandinavia. In the latter part of February in the same year a new volcano, the Askja, was formed in the Dygyur-Jelden hills lying north of the Vatna Jökull. Two enterprising Icelanders, Jon Thorkellsson and Sigintur Krakson, have recently explored these volcanic districts, and they succeeded with great risk and labour in descending the crater of the Askja. At about 3300 feet below the upper edge of the crater they reached the bottom, and found themselves on the verge of a boiling lake, apparently of great depth. Near the southern end of this lake the ground was broken by rents and chasms, barring farther progress in that direction, while the whole space echoed with the roar of loud underground thunder. North of the great crater the explorers found an opening some 650 feet wide, and seemingly of about the same depth, whence were emitted dense volumes of sulphurous vapours, accompanied by a loud almost deafening uproar.

The place has also been visited by Professor Johnstrup, who reports that the chasms and abysses of the central crater can be pierced by the eye only when the vapour has been dispersed by the wind. These exhalations burst through several openings in the crater, which is about 100 feet deep. On its southern side are three streamlets carrying the water precipitated by the condensed steam to a volcanic lake, which is nearly everywhere encircled by lofty perpendicular cliffs. The green

water of this lake has a temperature of 81° F. Round about the largest crater on the east there is a layer of sulphur several feet thick, and farther down a zone of snow from 10 to 30 feet thick. The southern craters have discharged a mass of gray slippery clay, rendering them inaccessible. Huge blocks of black sandstone strewn about bear evidence to the violence of the eruptions that here take place. But besides these rocks, mud only is thrown up, no lava, as in the Myvatn desert.

Amongst the indications of subterranean igneous forces are the *Geysers*, or hot springs, strewn all over the island.[1] During their periodical disturbances warm, often boiling, water is discharged with terrific force sometimes to a height of 100 feet through the rents and fissures formed by the steam pent up in the basalt and trachyte masses. Remarkable also are the mud volcanoes. Here the hot water, bursting with a hissing, spluttering noise through the cavities in the rocks, converts the rich clayey ground into a ceaselessly reeking and bubbling morass, exhaling sulphurous fumes, and every three or four hours discharging large and small masses to a height of 15 or 16 feet.[2]

[1] The word *geyser* is derived from the old Icelandic verb *geysa* or *gjosa*, to burst forth, or to rage. The earliest mention of the geysers of Iceland is by Saxo Grammaticus, a writer of the twelfth century.

[2] See Mr. John Coles, *Summer Travelling in Iceland*, 1882; Richard F. Burton, *Ultima Thule, a Summer in Iceland*, 1875; Dr. Samuel Kneeland, *An American in Iceland*, Boston, 1876; Lord William Watts, *Across the Vatna Jökull*, etc., 1877; Pajhally, *Summer in Iceland*, 1870; and Rev. S. Baring Gould, *Iceland: Its Scenes and Sagas*, 1863.

PHYSICAL MAP OF THE BRITISH ISLES

London; Edward Stanford, 55, Charing Cross, S.W.

CHAPTER VIII.

THE BRITISH ISLES.

1. *Outline and Surface.*

THE irregularity of outline both in Great Britain and in Ireland is a feature that cannot escape the attention of any one who inspects a map of these islands, and the fiord-like character of the west coast of Ireland and of Scotland has already been noticed in the Introduction. The high ratio of coast-line to surface relatively to other European countries will be seen on referring to the first statistical table at the end of the book.

Travelling westwards along the south coast of England, it is seen that bold rocky coasts begin in the neighbourhood of Lyme Regis, where Oolitic are succeeded by Liassic strata, and that bold cliffs are continued for the most part all round the south-west of England and the principality of Wales. Occurring again in the north of Lancashire, they pass almost uninterruptedly round Scotland and the north-east of England, and the same character belongs to by far the greater part of the Irish coast. The principal stretches of flat coast are to be found in the east and south of England, first in Lincolnshire between the Humber and the Wash, then from the south of Suffolk to the South Foreland in Kent, and finally in Sussex and Hants on the south coast. But even in the south-east of England the chalk forms cliffs of considerable magnitude.

It is needless to supplement the view of the superficial configuration of the British Islands furnished in the accompanying orographical map with a detailed description, and hence very few particulars on this subject will suffice. The highest summits in the British Isles are situated in Scotland, and in particular in the aggregate of mountain ranges known as the Grampians. The highest of all is *Ben Nevis*, in the west of Inverness-shire (4406 feet), and the next in height Ben Macdhui (4296 feet), one of a cluster of mountains at the meeting of the counties of Inverness, Banff, and Aberdeen. North of the Grampians Ben Wyvis, in a portion of Cromarty enclosed in Ross-shire, attains the height of 3722 feet, and Ben Dearg and Ben More are also considerably above 3000 feet in height. In the south of Scotland the highest point is Mount Merrick in Kirkcudbrightshire, which reaches an elevation of 2764 feet. In south Britain the culminating point is *Snowdon* in Carnarvonshire, the altitude of which is 3570 feet. This is in Wales; but in England itself the highest point is *Scawfell* in Cumberland, which rises to 3161 feet, while the culminating point of the Pennine range is Cross Fell in Cumberland (2892 feet). In Ireland the highest peak is in Macgillicuddy's Reeks in County Kerry, where *Carn Tual* attains an elevation of 3414 feet.

If the term "lowlands" be applied to all areas under 500 feet in height, it is found that in England they occupy about two-thirds of the total area, in Ireland as much as seven-eighths, but in Scotland no more than one-half. In the case of Ireland a subsidence amounting to 250 feet would place one-third of the entire area under water, while one of 500 feet would submerge the whole island, leaving only two archipelagos above the surface of the ocean, one in Ulster and western Connaught, and the other in Munster and south Leinster. The lowest

tracts in the two islands are the marshy district known as the Fens skirting the Wash, and Romney Marsh in the south-east of Kent. The former area has been partly drained, and is now intersected by canals; and covered with rich pastures dotted over with windmills.[1] To the central lowlands of Scotland access is afforded from the Highlands on the north by the famous Pass of Killiecrankie leading through the valley of the Garry, an affluent of the Tay. At the present day this pass is utilised by the railway which runs to the north coast of Scotland, and formerly, when a hostile feeling prevailed between the inhabitants of the highlands and lowlands, it was a point of strategic importance.

Of the numerous small islands surrounding the two principal isles, the most important group is that of the *Hebrides* in the west of Scotland. They are composed of an inner group lying not far from the coast,—to which group even Bute and Arran in the Firth of Clyde are generally referred,—and of an outer group stretching in a gentle curve beyond the Minch. Their whole number, exclusive of mere rocks without pasturage sufficient to support a single sheep, is about 490, but not more than 120 are inhabited. The total area is upwards of 3000 square miles, of which little more than one-tenth is arable. The rest of the surface consists of pasture land of little value, besides peat-bogs, morasses, barren sands, and rocks. The greatest proportion of level and arable land is to be found in Islay and Bute. Iona is interesting on account of its ecclesiastical ruins, pointing back to the time when the island was an important ecclesiastical centre for North Britain, a position of influence due to the fact that it was here that the first Christian mission-

[1] For description of the Fens, see *The Fenland, Past and Present*, by S. H. Miller and S. B. J. Skertchly, 1878.

aries from Ireland to Scotland established themselves under St. Columba.

The *Orkney Islands*, situated to the north of the Pentland Firth, number upwards of 70, of which 29 are inhabited. Pomona, the largest, is about 150 square miles in extent, or half the size of the island of Anglesey. The total area of the group is about 610 miles, but not much more than a fourth of this area is capable of being employed for tillage or pasture.

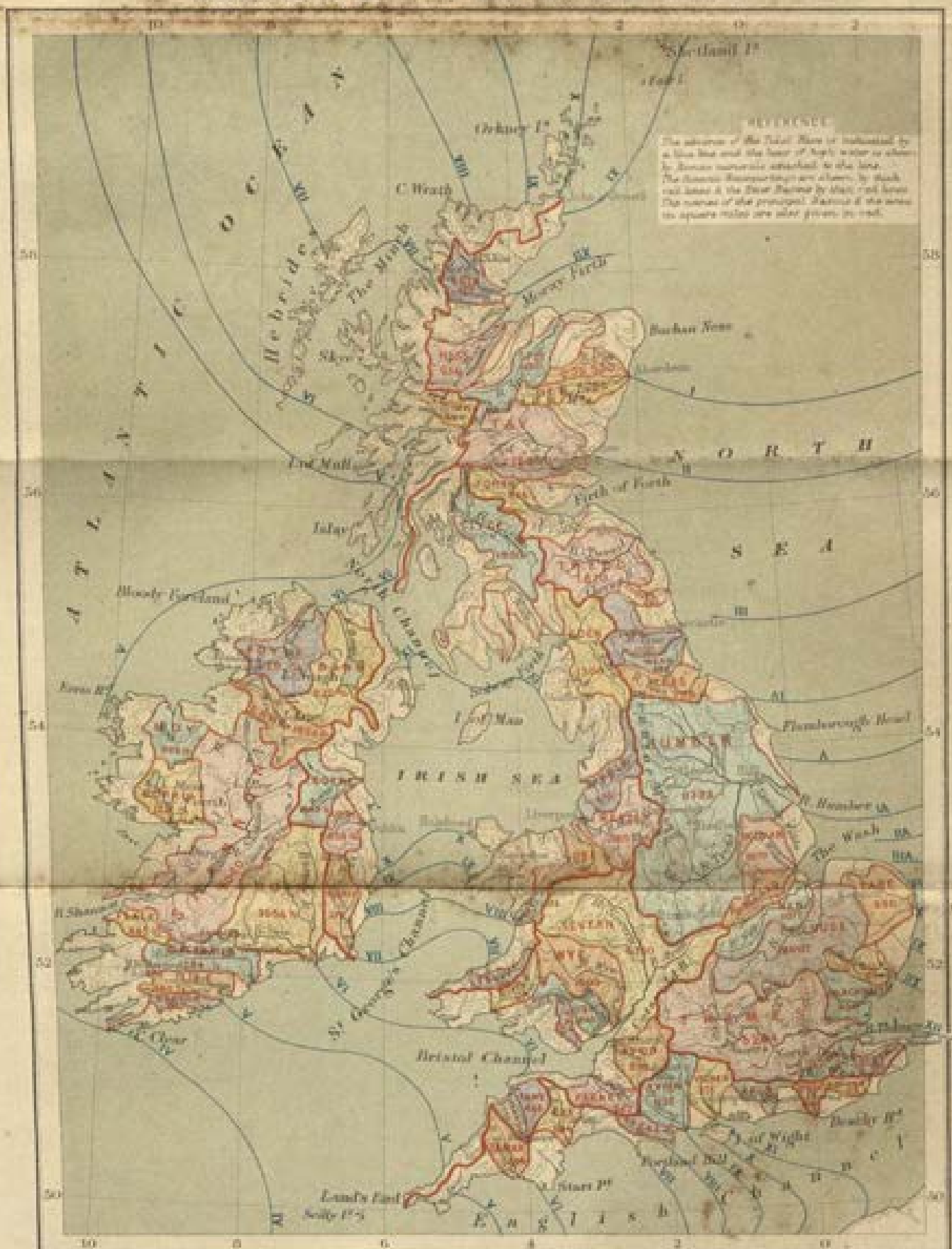
The *Shetland Islands*, lying at a distance of upwards of 70 miles still farther to the north-east, consists of about 100 larger or smaller islands or rocks with a total area of about 325 miles. Twenty-three of the group are inhabited. They are altogether without wood.

The *Isle of Man* in the Irish Sea also deserves special notice, inasmuch as it has an independent legislature. Its area is 227 square miles, less than two-thirds of which is profitably occupied. The hills, which spread over the southern part, are chiefly composed of clay slate, penetrated by bosses of granite, and are intersected by veins containing valuable ores of lead, and zinc, as well as of copper and iron.

2. *Rivers and Lakes.*

These may be disposed of with a brief notice, inasmuch as an inspection of the accompanying map will afford a fairly satisfactory idea of the chief features of the hydrography of the British Isles. It will be observed that the general water-parting is much nearer to the west than to the east side, but, since the former is consequently the steeper side, and since it is exposed to the rain-bearing winds from the Atlantic, the work of erosion is necessarily going on with much more energy on the west than on the east, so that the water-parting

WATERSHED MAP OF THE BRITISH ISLES


REFERENCE
ATLANTIC OCEAN
NORTH SEA
IRISH SEA
ENGLISH CHANNEL
Hebrides
Orkney Is
Shetland Is
C Wrath
Buchan Ness
Firth of Forth
Flamborough Head
Bristol Channel
St George's Channel
Land's End
Scilly Is
Start Pt
Beachy Hd
Isle of Wight
Portland Bill
Bloody Foreland
Isle of Man
Skye
Mull
Islay
Arran
Lundy
Anglesey
Holyhead
Liverpool
Blackpool
Barrow
Whitehaven
Solway Firth
Morecambe Bay
Humber
R Humber
Wash
R Severn
R Clyde
R Shannon
Dublin
Belfast
Londonderry
Galway
Limerick
Cork
Waterford
Wexford
Kilkenny
Tipperary
Donegal
Sligo
Mayo
Clare
Kerry
Tralee
Bantry
Wicklow
Carlow
Queens Co
Kings Co
Meath
Longford
Roscommon
Westmeath
Cavan
Monaghan
Fermanagh
Tyrone
Armagh
Down
Antrim
Derry
Leitrim
Louth
Dundalk
Drogheda
Dublin
Wicklow
Wexford
Waterford
Cork
Kerry
Limerick
Clare
Galway
Mayo
Sligo
Donegal
Tyrone
Fermanagh
Cavan
Monaghan
Armagh
Down
Antrim
Derry
Leitrim
Roscommon
Longford
Westmeath
Meath
Louth
Kilkenny
Tipperary
Queens Co
Kings Co
Carlow
Wicklow
Dublin
Drogheda
Dundalk

is gradually creeping eastwards. An illustration of this fact is afforded by the history of the Thames, which now has its source in the Cotswold Hills between Cheltenham and Cirencester, but at one time probably rose to the west of the escarpment forming those hills.[1]

Another feature that cannot escape attention is the frequency with which the British rivers open out into estuaries—a fact which has helped to give to Britain the unrivalled pre-eminence enjoyed by it as a maritime nation. Deltas are conspicuously absent, but it may be noted that the Thames and the Tay may be taken as examples of rivers which have at their mouths what Oscar Peschel has called "submarine deltas," that is, deposits of river sediment forming submarine banks. The estuaries of the British rivers are, in general, too long and wide, and the sediment carried down by the rivers is too scanty to admit of the rapid accumulation of deltaic deposits such as those of the Rhine, the Po, and the Danube.

Many of the British rivers have made breaches through ranges of hills in finding their way to the sea; and perhaps the most notable instance of this kind in the British Isles is to be found in the Shannon. This river began to flow across the Irish plain when it was covered by thousands of feet of strata, that have since disappeared, and has cut its way through the range of hills to the north of Limerick. So, also, most of the rivers of the Weald flow through gaps which they have themselves wrought in the North and South Downs, the Stour, the Medway, the Dart, the Mole, and the Wey, piercing the former, while the Arun, Adur, Ouse, and Cuckmare intersect the latter.[2] Other examples will be

[1] "On the River-Courses of England and Wales," by A. C. Ramsay, LL.D., F.R.S., *Quart. Journ. Geolog. Soc.*, vol. xxviii. p. 148, 1872.

[2] See Topley's *Geology of the Weald*, pp. 160-204.

referred to in the next section, when speaking of escarpments.[1]

The lakes of the British Isles are in general more remarkable for their beauty than for their size. Lough Neagh in Ireland is the only one that can rival in superficial area the larger of the Swiss lakes. Its extent is about 153 square miles, or scarcely three-fourths of that of the Lake of Geneva; while its depth—120 feet where deepest—is not much more than one-tenth of that of the same lake. But while the largest in area, it has none of the picturesque surroundings which attract thousands upon thousands of visitors to the smaller Lakes of Killarney in the south-west of the same island, the lakes of Cumberland and Westmoreland in England, and the lochs of the Highlands of Scotland. Its shores are low and marshy, and its surface is varied only with two small and uninteresting islands. Besides its size, however, there are two other circumstances worth noting regarding it. In the first place, its waters have been reputed to possess "petrifying" properties: this is due to the fact that the lake yields fragments of silicified wood derived probably from beds of lignite, and known as "Lough Neagh hones." In the second place, it is believed to be the oldest of all the lakes of the British Isles, the only one that there is ground for referring as far back as Pliocene times. All the others have been formed through various causes, the agency of ice being the chief, during the geological epoch now in progress.

3. *Geology and Geological History.*

It is in the extreme north-west of Scotland that we meet with the oldest rocks in the British Isles. These

[1] The hydrology of England and Wales in relation to economic questions is very fully treated by Mr. C. E. De Rance in his work entitled, *The Water Supply of England and Wales*, 1882.

VIEW IN SUTHERLANDSHIRE, SHOWING SUILVEIN AND CANISP. *To face page* 213.

rocks consist principally of gneiss, and belong to that ancient group of metamorphic rocks to which Dana has applied the term *Archæan*. Possibly they may be paralleled with the Laurentian rocks—a series so called by the late Sir W. Logan from the fact of their being widely developed on the St. Lawrence in Canada. In Scotland these Archæan rocks occupy the whole of the outer Hebrides, including the islands of Tiree and Coll, and a belt of varying width in the west of Ross and Sutherland. There they are succeeded unconformably by Cambrian rocks, outliers of which form some of the "grandest and most abrupt peaks of the north-west Highlands," such peaks, for example, as Suilven, Canisp, and Coulmore, lofty pillars which "the great excavator, Time, has left . . . to record the greatness of his operations."[1]

The Cambrian rocks of Scotland are again succeeded unconformably by Silurian strata, which extend over a large area bounded on the south by a line running from north-east to south-west from Stonehaven to Roseneath on the Firth of Clyde,—a line also marking in a general way the southern limit of the Scottish Highlands. Farther to the west they nearly cover the peninsula of Kintyre and the islands to the west of it. On the mainland the area occupied by these rocks embraces large patches invaded by granite and other intrusive masses. The Silurian rocks have been for the most part greatly disturbed and highly metamorphosed, so that while limestones with Lower Silurian fossils occur at the base of the series the greater part of the Silurian group in the Highlands consists of crystalline rocks, like gneiss and mica-schist.

The borders of the Moray Firth, and almost the

[1] Ramsay's *Physical Geology and Geography of Great Britain*, 5th ed., p. 288.

whole of the county of Caithness, are occupied by Old Red Sandstone formations, overlaid here and there, on or near the coast, by narrow strips of Oolitic rocks. On the west the islands of Skye and Mull, with portions of the adjoining mainland, are occupied by sheets of basalt, which, in all probability, are remnants of a vast outpouring that took place in older Tertiary times, and overspread the whole area between these parts of Scotland and the corresponding sheet covering the county of Antrim in the north-east of Ireland. The celebrated examples of prismatic columnar basalt forming Fingal's Cave in the small island of Staffa, and the Giant's Causeway in Ireland, belong to this great episode of igneous eruption.

Such is a general account of the geological structure of the Scottish Highlands. The folds into which the strata have been thrown, and which have a general trend from south-west to north-east, were produced at some period prior to the deposition of the Old Red Sandstone rocks. Before the river-systems to which the surface mainly owes its present configuration were formed, the region appears to have been covered in a large measure by deposits of the latter period,[1] in consequence of which the folds were for the most part superficially obliterated. Then followed a general upheaval of the whole area. Rivers began to flow along the courses marked out by the superficial configuration at the period of emergence. In the general direction of these rivers the influence of the original plication of the Silurian strata can still be detected, but there is no such correspondence between stratigraphical folds and river-valleys as if these had been, in the first instance, directly due to the former instead of being hollowed out by the various denuding agents themselves. West of the chain of lakes stretching north-eastwards from Loch Linnhe to the Beauly Firth

[1] Dr. A. Geikie in *Nature*, vol. xxix. p. 347, 1884.

the axis of a vast synclinal trough, that is, a region in which the strata on the whole dip downwards on both sides to a middle line, has been traced running parallel to the chain of lakes just mentioned, yet the mountains and valleys cross that axis as if it had never existed.

One instance of the continuity between the geology of Ireland and that of Scotland has already been mentioned in the case of the Tertiary basalts; and it may now be pointed out that the north-west of Ireland appears to have had the same physical history as the Highlands of Scotland generally. It is probable that certain granitoid and gneissic rocks in the north-west of Ireland may be paralleled with the Laurentians of the Hebrides. The Silurian strata of the Irish and Scottish areas certainly correspond, and the mountains of Donegal, and of the counties stretching thence to Galway Bay, have been carved out in the same way as those just spoken of in Scotland. One feature of special interest in the geology of this part of Ireland is worth noting. Towards the south-western extremity of the region now under consideration there occurs an extremely picturesque district between Lough Mask and the mouth of the inlet or fiord known as Killary harbour, and in that district the Lower Silurian rocks, highly metamorphosed, are unconformably overlaid by 7000 feet of Upper Silurian rocks without any trace of metamorphism, showing that the change of structure in which metamorphism consists took place before the rocks of the upper series were laid down.

Returning again to Scotland, we may notice especially a great synclinal trough, extending between the Silurian rocks of the north and those of the south. The southern limit of this trough runs from the neighbourhood of Girvan, on the coast of Ayr, nearly parallel to the northern limit, and terminates near Dunbar, on the coast

of Haddington. Within these limits are included the richest parts of the lowlands of Scotland, both as regards the agricultural capabilities of the soil and the mineral wealth beneath the surface. The geological history of this tract has been very varied, and this is still indicated in the great diversity of the superficial geological features.

In the first place, the whole of this basin was once filled by Old Red Sandstone deposits. During their deposition volcanic activity was rife on a gigantic scale, and immense masses of porphyrite lavas, felsites, and tuffs, attaining a total thickness of 6000 feet, still bear witness to the extent of the igneous outpourings. The Ochil range in the south of Perthshire, the Sidlaw range in Forfarshire, and partly also the Pentland Hills near Edinburgh, are due to the greater resistance which these hard volcanic rocks have offered to the forces of denudation.

In this same trough were next laid down the deposits of the Carboniferous system. The transition from the Old Red Sandstone to the rocks of the latter system is in Scotland very gradual, the basement beds of the Carboniferous exhibiting a commingling of forms of the two systems, and thus testifying to a partial continuance of the conditions that prevailed during the deposition of the earlier rocks. In particular, the volcanic activity that characterised the Old Red Sandstone period prevailed with as great energy during the early part of the Carboniferous era, and there are still abundant traces of it in the form of porphyrites and tuffs not only within the limits of the trough of which we are speaking, but also in the south-east of Scotland (the Cheviots), where the Carboniferous system of that country becomes continuous with that of the north of England. The volcanic activity continued on into the true Carboniferous Lime-

stone period, but died out before that of the coal-measures. Both in Scotland and in Northumberland the epoch of the Carboniferous Limestone was one of intermittent depression, giving rise to a very varied succession of limestones, sandstones, shales, and coal seams, none of which attain any great thickness. The rocks of this period must here have been laid down near the oscillating shores of a sea, the deeper parts of which lay farther to the south, and received the thicker deposits of what is known as Mountain Limestone.

Within the Scottish trough, the limits of which are indicated above, the Carboniferous Limestone rocks were succeeded by those of the true coal-measures, larger and smaller patches of which still remain scattered over parts of the area, while in Ayrshire, on the river Ayr, a patch of overlying Permian still survives.

Beyond the trough, in the south of Scotland, the greater part of the surface is occupied by a series of Lower Silurian rocks, which are on the whole much less contorted and metamorphosed, and much softer than those of the Scottish Highlands. Sandy, gritty, and shaly unfossiliferous strata are here the characteristic rocks. So also the scenery to which the denudation of these rocks has given rise is much less rugged than that of the Highlands. The hills are more rounded in outline, and the whole country consists in the main of a succession of upland and lowland sheep-pastures.[1] Turning to Ireland, we again see proof of the continuity of its geological structure with that of the neighbouring island in the fact that the same strata are there found repeated in a broad belt running in a south-eastwardly direction from the coast of the County Down into the heart of Roscommon and Longford. In Scotland this southern Silurian area encloses large patches of granite, and is

[1] *The Scenery of Scotland*, by Prof. A. Geikie.

overlaid in places by remains of Permian rocks, the southernmost of which are continuous with the Permian area of the north-west of England.

In the north of England generally we have a striking illustration of the want of correspondence between the existing superficial configuration and the geological structure. This is due to the fact that we have here the ruins of a vast plateau which must at one time have been raised above the surface of the water, with a general slope east and west from the line now forming the axis of the Pennine chain, but with its highest part between Derwent Water and Windermere. At the time when this region became elevated its superficial strata must have belonged entirely to the Carboniferous system, the coal-measures and the Millstone Grit being uppermost, and below these, and possibly not so continuous, the Carboniferous Limestone. From the "dome-shaped eminence" which culminated in the part of the Lake District just mentioned, rivers began to radiate in all directions, and gradually to erode the valleys with which that region is now furrowed, removing all the strata down to the Silurian and contemporaneous volcanic rocks which now appear at the surface. At the same time, by means of the denudation effected on both slopes of the longitudinal axis above referred to, the Pennine chain was gradually exposed in its present form, the coal-measures being for the most part swept away, while the greater part of the chain shows only the Millstone Grit. Where that also is removed the underlying Carboniferous Limestone is exposed in small patches, but of great thickness, forming hills from which it has earned the name of Mountain Limestone, and which indicate that in this region must have lain the deepest part of the Carboniferous sea. The coal-measures remain in larger patches farther away from the central axis—in the east of Northumberland and

Durham, in the west of Cumberland, in the south of Lancashire, and the south of Yorkshire, and in neighbouring parts.

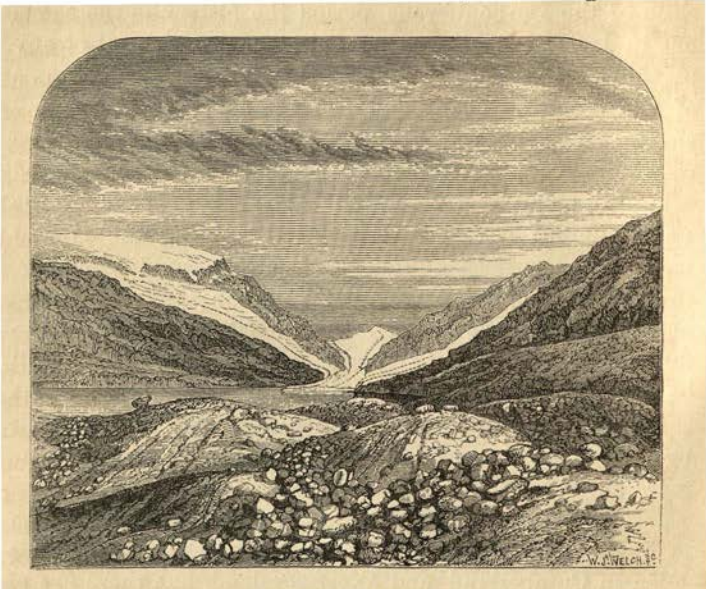
Throughout the greater part of Ireland we see the final results of a history which began in the same way as that of the part of England now under consideration, but was different in its subsequent course. Down to the close of the Carboniferous period the history is the same, but in Ireland there was no subsequent upheaval of any portion of the interior such as that indicated by the axis of the Pennine chain and the remnants of the dome-shaped area of the Lake District of England. The re-emergence of the island was due to a general and tolerably equal elevation, and hence the deposits of the Carboniferous system have been left covering the greater part of the surface, and hence, too, the denuding agents, though they must have cleared away an immense thickness of strata, have allowed the interior to remain in the form of an uninterrupted plain. In most places, as will be seen from the map, the Upper Carboniferous rocks containing the coal-measures have been removed, so that by far the greater part of the area in question is now represented by those of the lower series.[1]

Returning again to the highland region of the north of England we find Permian deposits in the valley of the Eden in Cumberland and Westmoreland, but these are of a date posterior to the general elevation affecting this district. They are composed of red sandstones, with some calcareous conglomerates interbedded, the latter derived from the waste of the adjacent Carboniferous Limestone. On the east side, where the Carboniferous rocks also dip under Permian strata, such sandstones are

[1] For an excellent description of the geological structure of Ireland, see *The Physical Geology and Geography of Ireland*, by E. Hull, M.A., F.R.S., 1878.

not so well represented, but there is a much greater development of Magnesian limestone, which was most probably deposited, as well as the sandstone, in a salt lake.

In Wales we have to some extent a repetition of the phenomena belonging to the early Palæozoic epoch of Scotland and Ireland. It is true that, in the opinion of



PASS OF LLANBERIS.

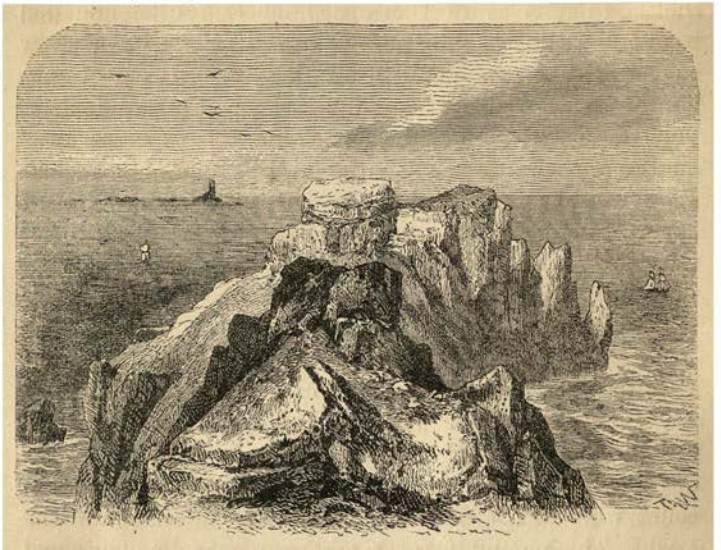
the most experienced field geologists, there are in that part of the island no traces of Laurentian rocks, but there are small remnants of the Cambrian series in Anglesey, in Merionethshire, in Carnarvonshire, and in Pembrokeshire. Valuable roofing slates occur in the Cambrian rocks of North Wales. The greater part of the rest of the principality is composed of Lower Silurian strata, which are here, however, succeeded by a considerable

development of Upper Silurian rocks, such as occur in Scotland only in small isolated patches. In these rocks also there are signs of an early upheaval, which threw the strata into a series of folds, with a general trend from south-west to north-east; but the Welsh Silurians do not exhibit such signs of metamorphic action as are found in the Highlands of Scotland. The action of denudation has resulted in the excavation of deep valleys bounded by rugged mountains, and in some cases, as in that of Snowdon and Cader Idris, the mountains are the remnants of volcanic eruptions in Silurian times. Eruptive rocks of similar age occur also in the Lake District of Cumberland. In south Wales the Silurian rocks form the bottom of a separate basin, in which later Palæozoic rocks—Old Red Sandstone and Carboniferous—have been successively laid down.

Now, on turning to Ireland, we again see in the districts answering both to North and South Wales very striking proofs of the correspondence between the physical history of the two islands. In the east of Leinster the Cambrian and Silurian rocks of North Wales reappear, and here again the general trend of the folds is from south-west to north-east, as in North Wales and in Scotland. The mountains of Wicklow, it may be mentioned, are due to the resistance offered to the denuding agents by protrusions of granite. But in the south-west of Ireland, and likewise in South Wales, the Silurian and later Palæozoic rocks were thrown into a series of folds running east and west, and it is these folds that give rise to the mountain-ridges of Kerry and Cork, which have been referred to as the best examples in Britain of true mountain structure.[1] Of the later Palæozoic rocks of Ireland it may be noted that there is difficulty in correlating the so-called Old Red Sandstone with any of the deposits of

[1] Dr. A. Geikie in *Nature*, vol. xxix. pp. 325, 348, 1884.

the sister island, and by Kinahan the lower group of rocks which in Ireland have received that name are referred to the upper part of the Silurian formation, while the later group so called "not only graduate into the Carboniferous rocks proper, but occur with them on different geological horizons."[1]



THE LAND'S END.

The only remaining part of the British Isles that can be said to have a highland character is the county of Cornwall and part of Devon. Here also Palæozoic strata as low as the Lower Silurian have been exposed by denudation, though these appear only in two small patches on the south coast, at Start Point and Dodman Point. The south-western peninsula is formed mainly of slaty rocks of Devonian age, known locally as "killas." The most rugged heights of this region are due to the pro-

[1] *Manual of the Geology of Ireland*, by G. H. Kinahan, pp. 5 and 6.

trusion through these slates of large masses of granite, which stretch away in isolated bosses as far as the Land's End. The most easterly of these granitic protrusions forms the basis of the crag-crowned tableland of Dartmoor in Devon. Formerly a forest, this tableland is now, as its name indicates, nothing but a moor enclosed by a natural rampart of rocky heights, and would be almost uninhabited, except by moorland birds, were it not for the state prison that has been erected in its centre, and which is used as a depot for convicts employed in bringing into cultivation the adjacent land. In the north of Devon, on the borders of Somerset, lies another moorland district, but with a different character and a different origin—the so-called Exmoor Forest. It is not so much a tableland as a series of hills and valleys due to unequal erosion in Devonian slate and beds of the New Red Marl (Triassic).

The history of the rest of England is comparatively simple. The bulk of the oldest Secondary rocks fill up the interval between the highland regions of Wales and the north of England, and run out in a belt northwards to the mouth of the Tees. To the area occupied by them belongs the water-parting whence the drainage of the middle of England is sent northwards to the Irish and the North Sea and southwards to the Bristol Channel. To the east of these strata there follows a succession of later Secondary rocks, all of which have a general strike from south-west to north-east, and have received in course of elevation a general tilt to the south-east. Their inland boundaries are frequently marked by escarpments sloping at right angles to this south-easterly tilt or dip of the strata, and the most prominent of these escarpments stand out as hills, such as the Cotswold Hills in Gloucester belonging to the Oolitic escarpment, and the Chiltern Hills in Oxford and Bucks belonging to

the Chalk. In the north the Jurassic rocks (Lias and Oolite) spread out into the plateaux of the east of Yorkshire.

From the nature of the case the escarpments just spoken of are gradually retreating eastwards in the direction of the dip, denuding agents being constantly at work on these steep slopes. It must, therefore, be remembered that their present position is far from indicating the original boundary of the deposits to which they belong. There can be little doubt that the Oolitic strata, for example, at one time abutted on the mountainous region now forming Wales and parts of the adjacent counties, as well as against those of Devon, stretching right across what is now the Bristol Channel;[1] but these Oolites have been gradually eaten backwards, while at the same time an immense thickness has been pared away from their surface as well as from the overlying rocks. It is for this reason that not only these escarpments, but similar escarpments of older date, such as those of the Old Red Sandstone forming the Beacons in Brecknock, are so regularly breached by rivers. When the rivers began to flow, their beds lay far above the present level, and they have sunk down through the rocks in course of ages, during which escarpments, originally beyond their sources, have gradually in their retreat descended along their banks.

The older Tertiary deposits of England are found in two basins—the London basin and the Hampshire basin—which appear to have been at one time continuous. The London basin consists of a thick marine deposit, known as the London clay, resting on Lower Tertiaries partly of marine and partly of estuarine type, and overlaid by patches of Bagshot sand. The Hampshire basin,

[1] Ramsay's *Physical Geology and Geography of Great Britain*, 5th ed., p. 504.

which extends across to the Isle of Wight, contains above the London clay alternating strata which have been formed in a great estuary, and in which marine interstratifications occur along with fresh-water beds.

In the tract between these two basins denudation has exposed some of the oldest formations of Cretaceous age, known as the Wealdens. These are the relics of an estuary of a similar character to that of the Eocene of the Hampshire basin, but still older. The denudation of the upper Cretaceous formations from this area has led to the formation of the escarpments of the North and South Downs—two ranges of low chalk-hills running east and west, and gradually merging westwards in the undulating tract known as Salisbury Plain and the rather more rugged Marlborough Downs. These chalk plateaux are covered merely with a thin soil supporting short dense turf, and are sheep-pastures. Both on Salisbury Plain and on Marlborough Downs stand celebrated megalithic monuments: on the former the famous circles of Stonehenge, and on the latter the similar remains of Avebury. These monuments are even of geological interest, inasmuch as they are composed of fragments of hard sandstone known as "Sarsen stones," or "Greywether sandstones," which are consolidated portions of some of the Eocene beds that once extended as far to the west as the region indicated by the presence of these surviving relics.

Of later Tertiary deposits, the remains in England are scanty but interesting. A small deposit of clays and lignite at Bovey Tracey in Devonshire is generally regarded as of Miocene age, inasmuch as it has yielded an abundant harvest of vegetable fossils, such as have been mentioned in the Introduction as characterising the Miocene deposits in different parts of Europe and North America. According to Mr. Starkie Gardner the Bovey

beds should be placed in the Middle Eocene series. The Pliocene Epoch is represented by the Red, the Coralline, and the Norwich Crags of East Anglia. The latter is known also as the "Mammaliferous Crag," on account of the large number of mammalian remains that have been obtained from it.

Finally, of post-Pliocene date are the remarkably rich alluvial flats of Holderness, composed of boulder-clay, in the south-east of Yorkshire—a tract which is unfortunately being steadily diminished by the encroachment of the sea; the low alluvial deposits in the Fenland on the east of Lincoln, and those by which the Wash is being gradually filled up; the alluvial tract in the estuary of the Thames, including the Isle of Dogs; Romney Marsh on the south-east—a rich pastoral tract which has to be protected by embankments from the inroads of the sea at high water; the Somersetshire levels and other tracts in the neighbourhood of the Bristol Channel; and finally, the alluvial land on the eastern border of Lancashire. But to the same general date, it must be remembered, belong all the glacial drifts which have contributed so much to give smoothness and roundness to the features of every part of the country except the extreme south, as well as to overspread it with a greater or less depth of finely triturated soil.[1]

4. *Minerals.*

The greatest sources of the mineral wealth of the British Isles are undoubtedly to be found in the *Coal-Measures*, the position of which has already been roughly indicated in the previous geological sketch. In Britain, as elsewhere, coal may, indeed, be found in other strata

[1] An excellent description of the structure of southern Britain is given by Mr. H. B. Woodward in his *Geology of England and Wales*, 1876.

than those of the Carboniferous system; but it is in that formation that all the beds of coal worth working in this country are situated. In the South Wales coalfield there are more than 100 beds of coal, about 70 of which are worked. In Leicestershire there are about 30 known seams; in Lancashire about 40 beds of coal over 1 foot in thickness; in Staffordshire there is a single bed with a thickness of 40 feet. The coalfields of Northumberland and Durham, and of the Lowlands of Scotland, are likewise remarkably rich; but Ireland, in spite of the immense development which the Carboniferous system there attains, has comparatively little of this form of mineral wealth. Six different coals are worked in a small area in the Blackwater valley in the south of Cork; but the richest coalfield in Ireland, so far as is yet known, is in Kilkenny, where there are seven workable beds, yielding an anthracite containing from 94 to 96 per cent of carbon. In the north, between Dungannon and Lough Neagh, there is a small coalfield partly underlying the Triassic rocks of that region, where good coal is obtained; but hitherto this field has been worked only near the surface, and one cannot say how rich it might prove to be if worked to a greater depth. The value of the coalfields of Britain consists not only in the fact of their yielding coal itself, but also in that they mostly contain along with the coal a greater or less proportion of ironstone. The ore is generally in the form of an impure carbonate, known as *clay ironstone*, which occurs in thin seams, and as nodules scattered through the coal-measure shales. One of the most valuable of these ores for smelting purposes is the *blackband*, which owes its colour and its name to the amount of carbonaceous matter associated with the ore, and serving to facilitate the smelting process.

Even coal and iron do not exhaust the mineral value

of the British coal-measures, for they also yield quantities of clays, the chief of which is the *fire-clay* so largely used in the making of crucibles and fire-bricks for the construction of furnaces.[1]

From the statement made above, that all our coalfields contain more or less iron ore, it must not be inferred that thence only are our supplies of iron obtained. The rich red and brown hæmatites, or oxides of iron, are met with far away from the coalfields, though in some cases also within their area. Near Ulverstone red hæmatite occurs in irregular deposits in the Mountain Limestone, sometimes filling caverns which have no doubt been hollowed out in the rock by the action of carbonated water. Similar deposits of hæmatite are found also in great abundance near Whitehaven in Cumberland, on the borders of the north-western coalfield, while brown hæmatite is worked not only in the south Wales and the Forest-of-Dean coalfields, but also in Cornwall, and to a smaller extent in Antrim in Ireland. Iron ores are likewise obtained in large quantities from the Liassic deposits in the Cleveland district of north-eastern Yorkshire, where their discovery occasioned the rapid growth of the town of Middlesbrough on the Tees. Large quantities of siliceous brown ironstone are also procured from the Northampton sands of the Oolites. In olden times iron ores were largely obtained and smelted in the Weald of Kent and Sussex, where the forests which then existed afforded a supply of charcoal as fuel for the iron-workers. Iron furnaces still blazed in this district till late in last century. The last to be extinguished is said to have been at Ashburnham.[2]

Next to coal and iron, the ores of lead, tin, zinc, and

[1] For a detailed description of the coalfields, see Prof. Hull's *Coalfields of Great Britain*, 4th ed., 1881.

[2] Topley's "Geology of the Weald," *Mem. Geol. Survey*, 1875.

copper are the most important of British minerals. All these are obtained from deposits almost wholly confined to the Palæozoic rocks. *Lead*, in the form of galena, is chiefly found in the Carboniferous Limestone districts of North Wales, Derbyshire, Lancashire, and the Yorkshire dales; it also occurs in the underlying Silurian strata, as in Mid-Wales, the Isle of Man, and the Leadhills in the south of Scotland. The silver-lead mines of Cardiganshire were very largely worked in the seventeenth century, and yielded sufficient profit to Sir Hugh Myddleton to enable him to execute his great project of bringing the New River from Ware, in Hertfordshire, to London.

Copper ores are mainly derived from the Devonian rocks of Devon and Cornwall, known as "killas," and to a less extent from the Lower Silurian rocks of Wales, especially in the counties of Cardigan and Montgomery. *Tin ore* is obtained only in Cornwall and Devon, where it occurs in lodes, or veins, near the junction of the killas with the associated granite. The tin deposits of Cornwall were worked in very early times, long prior to the Roman invasion.[1] *Zinc* is produced in considerable quantities in the Isle of Man, and in the counties of Denbigh, Montgomery, Derby, and Cornwall. Cornwall likewise yields ores of bismuth, manganese, and arsenic, and other useful minerals.

The precious metals likewise occur to a limited extent in the British Isles, though not in sufficient abundance to place them among the more valuable of our mineral treasures. *Gold* is still procured at the Clogau Mine in Merionethshire, where it occurs in lodes near the base of the Lingula flags, a member of the Cambrian series. Gold mines were formerly worked in Carmarthenshire; and so extensive are these old works that a minor valley

[1] For early history of Cornish mining, see Mr. Robert Hunt's *British Mining*, 1884.

was in the course of ages scooped out in the hillside. The principal works are of Roman origin, but it is surmised that the ruder caverns excavated for the prosecution of this industry date from more ancient British times.[1] Gold was worked in Crawford Moor, in the south of Scotland, as far back as the reign of James IV., and small quantities may still be found in the burns near Leadhills.[2] It also occurs in Sutherlandshire, where considerable excitement prevailed a few years ago in consequence of its discovery. Grains of gold are occasionally found in Cornwall and Devon, associated with "stream tin."[3] *Silver* occurs in Cornwall, and is largely extracted from lead ores elsewhere. Some of the lead lodes of South Wales, as well as those of Scotland already mentioned, are particularly argentiferous.

As in many other parts of Europe, so in England there are large *salt* beds in rocks of Triassic age. Practically inexhaustible supplies of this mineral are to be found in the rock-salt and brine-pits belonging to the New Red Marl of Cheshire. It is also obtained from Permian rocks near Middlesbrough.

Of other mineral substances we may first mention *slate*, derived principally from the older rocks of North Wales. The largest slate quarries in the world lie in the Cambrian rocks of Carnarvonshire. "The Penrhyn slate quarry near Bangor presents a wonderful spectacle of industry. It is about half a mile in length, and a quarter of a mile wide, and forms a vast amphitheatre, which is worked all round, on one side in thirteen high and broad terraces, like the steps of a Titanic stair. The periodical blastings sound like the firing of parks of

[1] Ramsay's *Phys. Geol. and Geog. of Great Brit.*, 5th ed., p. 594.

[2] *Early Records Relating to Mining in Scotland*, collected by R. W. Cochran-Patrick, of Woodside, 1878.

[3] For a general description of the occurrence of gold, see *Gold: its Occurrence and Extraction*, by A. G. Lock, 1882.

artillery. Vast mounds of rubbish, the waste of the quarry, cover the hills on either side."[1] In Scotland, in the small island of Easdale in the Firth of Lorn, there are slate quarries that have been worked for many years, but they are of small importance compared with those of north Wales. Good slates are yielded by the old rocks in the south-west of Ireland. *Graphite*, or "black-lead," as it is popularly called, known formerly as "wad," is found in great purity in Borrowdale, Cumberland.[2]

The chief *building stones* of our country are the limestones of the Oolitic rocks, the Magnesian Limestone, the limestones and sandstones of the Carboniferous period, and sandstones of the Old and New Red series. Of the Oolitic building stones, the most valuable are the Portland stone and the Bath Oolite, the former a beautiful white close-grained stone, and the latter a creamy oolitic rock, remarkable for the ease with which it is cut when freshly quarried. The Magnesian Limestone, of which, among other edifices, the Houses of Parliament are chiefly built, is very variable in quality; but some specimens of it could hardly be surpassed for the resistance they offer to the action of the weather, some old buildings in the construction of which it was employed still having the edges of the stones as sharp as when they came fresh from the mason's hands many centuries ago. *Flagstones* used for foot-pavements in London are chiefly micaceous sandstones of the Yorkshire coal-measures. Good flagstones are also obtained from both the northern and southern basin of the Old Red Sandstone in Scotland. Those of the north are dark gray bituminous and calcareous slabs, known as "Caithness flags," while the name of "Arbroath flags" is given to those derived from the eastern part of the southern basin.

[1] Ramsay's *Phys. Geol. and Geog. of Great Brit.*, 5th ed., p. 591.

[2] Clifton Ward's "Geology of the Lake District," *Mem. Geol. Sur.*

Granite is largely quarried in Devonshire and Cornwall, on Shap Fell in Westmoreland, and in Scotland near Aberdeen and Peterhead. In Devon and Cornwall the local decomposition of the granite has afforded an important substance known as *kaolin*, or "porcelain clay." Coarser *clays*, such as pipe-clay, are obtained from Eocene beds in the neighbourhood of Poole, in Dorsetshire, and from Miocene deposits at Bovey, in Devonshire. These are largely used in the manufacture of earthenware. The *flints* found embedded in the chalk are calcined and ground for mixture with the clay in the production of porcelain. The *glass-sand* used in this country is chiefly derived from the Eocene beds of the Isle of Wight, and from the sand-dunes on the borders of the Bristol Channel.

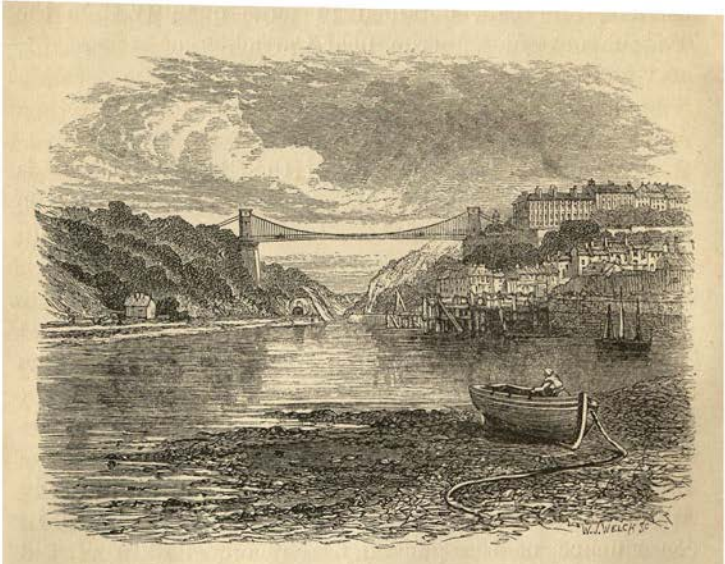
Of the ores found in Ireland, the most frequently met with are those of iron, copper, lead, and sulphur, besides which, gold, silver, and copper occur native. The ancient annals of Ireland prove that gold was worked at an early period in the mountains of Dublin and Wicklow, but it is now obtained solely from placer-mines in the latter county, and that only in small quantity. In the north-west of Tipperary native silver occurs associated with argentiferous lead, and mines have been worked there from a very remote period. Lead occurs also in Limerick, Clare, Galway, and most plentifully of all in the Avoca mines, County Wicklow, where it is associated with iron ores. The latter ores occur also at various places in the coal-measures, especially in the Connaught coalfield, but the only part of the island where they are of great economical value is in the county of Antrim, where they are found in association with the basaltic rocks, especially near Larne. The brown hæmatite there obtained forms an article of trade under the name of "Belfast aluminous ore." Copper mines have been

worked at different times in Waterford and Wicklow, but this metal is now chiefly obtained from the south-west of Cork. "Sulphur ore" (iron pyrites) is another of the products of the Avoca mines of County Wicklow; and among the other minerals of Ireland may be mentioned barytes (sulphate of barium), found in various localities, alum shales, in the lower coal-measures of Munster and other districts, and salt, obtained in large quantity from the Triassic rocks at Duncrue, near Carrickfergus.

5. *Soil.*

With regard to the soil of the British Isles, it is important to remember that over a great part of the surface the glaciers of the Ice Age have mixed up materials derived from different kinds of rocks which they traversed in their path, and overspread many parts with a deep layer of material which does not derive its character from the underlying rocks. Nevertheless the influence of geological structure is plainly observable in many parts of the country in the character of the superficial stratum of soil and in the general aspect of the vegetation consequent thereon. On the whole, the Palæozoic strata are covered with only a thin coating of soil, in consequence of the generally refractory nature of the rocks of which they are composed; and for this reason, as well as because they occupy chiefly the higher and therefore colder and moister parts of the country, they are in general not very well adapted for tillage. The exceptional fertility of large tracts of the great central valley of Scotland is a consequence of the ice action just referred to, the situation and configuration of that part of the country having enabled it to receive a deep covering of well-mingled soil of glacial origin. The Palæozoic strata which exhibit most natural fertility are the Permian and

Old Red Sandstones. The beautiful vale of Eden, opening from the south into the Solway Firth, owes its soil partly to the Permian rocks, but here also boulder-clay has greatly contributed to the fertility of the surface. The rivers traversing the Old Red Sandstone district of south Wales and the adjoining parts of England—the Towey, the Usk, and the Wye—are unsurpassed for quiet



GORGE OF THE AVON, BRISTOL.

and fertile beauty; and if one ascends to the summit of the Malvern Hills, on the eastern edge of this Old Red Sandstone district, and looks westwards, the eye commands a vast tract, unrivalled in varied beauty, spreading out in far-stretching undulations of hill and dale, dotted with towns and villages, farms and parks, noble woods and orchards, with fruit-trees set in every hedge, "while through the fertile scene wander the Tame, the Lug, and

the stately Wye, in many a broad curvature, winding its way from the distant Plynlymmon, to lose itself in the wide estuary of the Severn." [1]

It is to the domain of the Secondary and later rocks that most of the corn-growing land of England belongs, and it is here that the local influence of soil depending on the subjacent rocks is often most observable. The soft New Red Sandstone, and especially the Marl, both of Triassic age, when bare of boulder-clay, decompose readily, and form deep fertile loams. Many a rich scene of cornfields and woodlands belongs to the area occupied by these rocks in the region between the highlands of Wales and those of the north of England; and it is worthy of attention, likewise, that the most extensive of the fertile valleys of Yorkshire, the Vale of the Lower Ouse, or the Vale of York, as it is sometimes called, and the Vale of Stockton-on-the-Tees, are mainly occupied by a continuous band of these strata, though here also there is much glacial drift. To the west of that band we have only the heathy plateaux of Carboniferous age furrowed by numberless beautiful dales; while to the east there are the Liassic moors on the north, separated by the Vale of Pickering (the valley of the Derwent) from the chalky Wolds on the south. But while such is the general character of the Triassic sandstones and marls, a marked exception is presented to the prevailing fertility where the conglomerate beds of the New Red Sandstone come to the surface. The mixture of which these beds are composed yields only a barren soil, on which lie various tracts that have partly remained uncultivated to this day. Such, for example, are Sherwood Forest in Nottinghamshire, and the ridges east of the Severn, near Bridgnorth in Shropshire.

Of the strata next in order, the most fertile beds are

[1] Ramsay, *Phys. Geol. and Geog. of Great Brit.*, 5th ed. p. 568.

the marlstones of the middle Lias, well seen in Gloucestershire and the north of Oxfordshire. The prevailing limestone beds of the Oolite do not generally yield a very thick soil. It is the equivalents of the Lower Oolites that form the moors of the north-east of Yorkshire, whereas Kimeridge clay occupies the fertile vale of Pickering already mentioned. In the Cretaceous series there is a great variety of soils. The Lower Greensand is in part siliceous, and in many places consequently intractable and barren, all the more so since it lies in a great measure beyond the region where it could receive a covering of boulder-clay. It is from this cause that we may still see on the borders of the Weald a tract extending from Leith Hill to Petersfield, on which there are many wide-spread unenclosed heaths, almost as wild as the moors of Wales and the Highlands of Scotland; but in Kent, where there is much limestone, the Lower Greensand becomes more fertile. The Weald clay itself naturally forms a damp, stiff soil, but has been greatly improved by artificial means. Formerly, as already indicated, and as the name implies, this region was mainly covered by wood, and even still much of the country is well wooded, especially on the west, where there are extensive remains of the old forests of Tilgate, Ashdown, and St. Leonard's. The Upper Greensand again generally forms a finer arable soil, and though it mostly crops out only as a narrow band along the foot of the chalk escarpment, its presence, as has been pointed out by Mr. Topley, is revealed in a curious and interesting manner by the fact that a large proportion of the villages are planted upon it. Out of 397 villages in the whole of the Weald, 73, or 18 per cent, are situated on this narrow band; and often the parishes belonging to these villages climb the chalk escarpment, so as to include a bit of hill-pasture, and at

the same time stretch inwards, so as to embrace a portion of what was originally woodland on or towards the Weald clay.[1]

The soil of the chalk is generally thin and poor, and an idea of its characteristic vegetation may be gathered from the appearance of Salisbury Plain and Marlborough Downs already referred to, or from the bare heights of the North and South Downs in Kent and Sussex, on the steep slopes of which the chalk frequently lies only an inch or two beneath the surface. The thinness of the soil is due to the fact that the surface of the rock, instead of decomposing to form a layer of loose particles, has its chief constituent, carbonate of lime, dissolved and washed away by the rain. In many places the earthy impurities of the chalk are left after this process to form a stiff, cold clay, plentiful on parts of the plains of Wiltshire, Berkshire, and Herts. In other parts, as in eastern Herts, in Essex, and in Suffolk, the chalk is almost entirely buried under thick accumulations of glacial drift, which completely alters the agricultural character of the country.

Most of the Eocene beds of England are well cultivated, but their fertility is due in many parts not to the natural qualities of the soil so much as to prolonged labour necessitated by the wants of the large population which so long ago made its centre within the area occupied by these strata. Some of these beds, however, still remain barren. Such is the case with the Bagshot beds in the west of the London, and the north of the Hampshire basin, where the soil is for the most part too loose and sandy for cultivation, while in the New Forest district, in the west of the Hampshire basin, cultivation is almost equally hindered by the prevalence of wet and unkindly clays and gravels.

[1] See a paper on "Parish Boundaries in the south-east of England," by William Topley, F.G.S., in *Journ. Anthropol. Inst.*, vol. iii. p. 32 (1874).

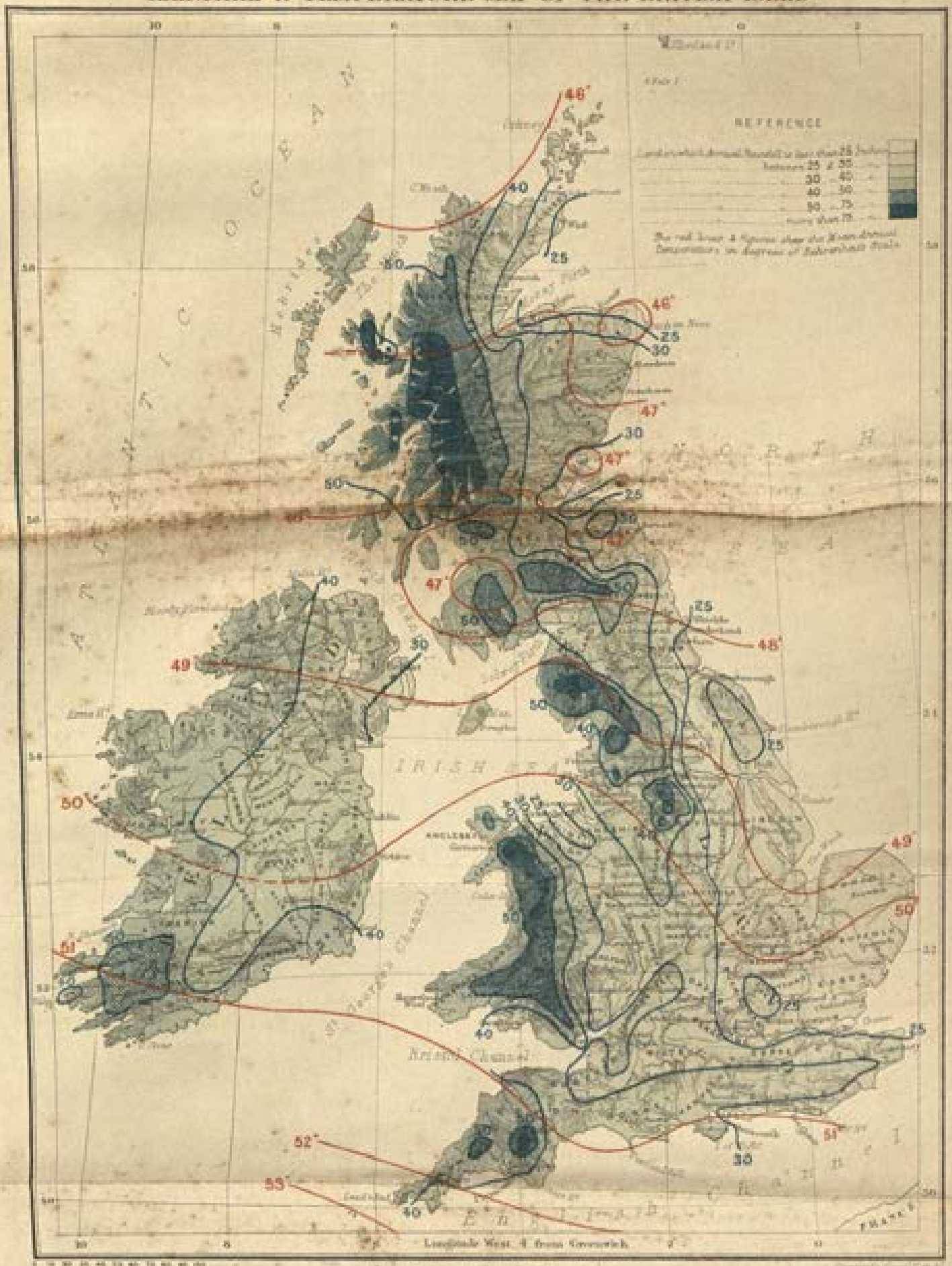
In Ireland all the richest soils are composed of material brought from a distance. Such, for example, are the *callows* or alluvial flats on the banks of the Shannon and its tributaries. Such also are the soils filling the valley of the Lagan in Ulster, and those forming what is known as the Golden Vein, stretching from Cashel in Tipperary to Limerick, in both of which cases the fertility of the soil is greatly increased by the variety in composition of the surrounding rocks from which the soil is derived.[1] About one-seventh of the area of Ireland is covered with bogs, from many of which remains of the *Cervus megaceros* (*Megaceros hibernicus*), or "Irish elk," as it is called, have been dug up. The Bog of Allen, situated east of the Shannon, in King's County and Kildare, itself covers an area of 283,500 acres, being nearly three-fourths of the size of Yorkshire.

6. *Climate, Flora, and Fauna.*

With regard to the climate of the British Isles it is needless to add much to the information supplied by the maps illustrating the distribution of rainfall and temperature. The abundance of the rainfall in the west has already been referred to in the Introduction. The rainiest spot in England is Seathwaite in Cumberland, where the total annual rainfall amounts on an average to about 150 inches. This unfortunate pre-eminence is due to the fact that Seathwaite lies at the foot of high mountains which form an angle so situated that they arrest the moisture-laden winds both from the west across the Irish Sea, and from the south across Morecambe Bay. Even this degree of humidity, however, is rivalled, if not surpassed, by some of the glens and passes in the west of Scotland. As regards temperature, the British Isles, like Norway,

[1] *Manual of the Geology of Ireland*, by G. H. Kinahan, p. 291.

RAINFALL & TEMPERATURE MAP OF THE BRITISH ISLES



London: Edward Stanford, 55, Charing Cross.

enjoy in a high degree that equability which is due to the vicinity of the sea, and in particular to the indirect action of the warm marine currents from the south-west. The mean range of temperature between the average of the coldest and the average of the hottest month in England is $24\frac{1}{2}^\circ$ Fahr. as against 30° at Paris, and still greater extremes farther east and farther inland. This equability is enjoyed by Ireland even more than by the larger island, the former being more directly open to the beneficial influences of the equatorial marine and atmospheric currents, and being moreover sheltered by Great Britain from the cold polar currents blowing from the north-east. This circumstance enables the myrtle to grow in the open air in the north-east of Ireland, though it grows nowhere else at so high a latitude. At Dublin the mean winter temperature is 39°, which is from 3° to 6° higher than in the plains of Lombardy.

For the sake of affording a standard of comparison for other places not so well known to the majority of Englishmen, it may be mentioned that the mean January temperature at Greenwich is $38\frac{1}{2}^\circ$ F., the mean July temperature 62·5°, the mean of the whole year 49·7°; the average annual rainfall 25 inches; the average number of cloudless days in the course of the year $22\frac{1}{2}$; the average number of completely overcast days $61\frac{1}{6}$.[1]

The most notable fact connected with the flora and fauna of the British Isles is this, that, with one or two exceptions, all the members of both have been derived from the continent of Europe. There is not a single species of plants peculiar to our islands, and that circumstance is itself enough to prove that this archipelago must have been connected with the mainland at a date comparatively recent geologically, for it is uniformly found to be

[1] *Reduction of Photographic Records of Meteorological Observations at Greenwich*, by Sir G. B. Airy: Lond. 1878.

the case that when a region has been long isolated, either by climatic differences or in any other way, that region possesses some species of plants which are found nowhere else. We may take it then as established that the flora and fauna of the British Archipelago found their way hither by land, and that at no remote date. In fact, we have in the circumstance referred to the best proof that, subsequently to the Ice Age, there was a wide connection between Great Britain and Ireland and the mainland of Europe. The relation between the flora and fauna of Ireland and that of England leads us similarly to infer that the connection between the two British Isles was broken before that between England and the Continent; for the Irish flora and fauna are both much poorer than those of the sister isle. Ireland indeed contains only about two-thirds of the number of flowering plants and ferns belonging to Great Britain. Moreover, it has been shown by Prof. Leith Adams that the mammalian fauna of Ireland agrees more closely with that of England than with that of Scotland, from which it appears probable that the English mammals were prevented from crossing to Ireland by a lake occupying the site of the deeper parts of the Irish Sea and the broad river that must have flowed out of that lake through St. George's channel.[1]

One special circumstance relating to the flora of the south-west of Ireland, and partly also of England, is worthy of note. In these parts, which are specially favoured by the warm currents and breezes from the south-west, there are several members of the vegetable kingdom not found elsewhere in Britain, and not met with again in Europe till we come to the south-west of France and the Mediterranean region. The most striking example of this is the strawberry-tree (*Arbutus Unedo*),

[1] See *Proc. Royal Irish Acad.*, 2d ser. vol. iii. p. 99; and *Proc. Royal Dublin Soc.*, p. 42, 1878, cited in Geikie's *Prehistoric Europe*, p. 512.

which many tourists will remember as an ornament of the banks of the Lakes of Killarney, but which, though wide-spread in the Mediterranean region, is absent both from the west and from the interior of France.[1] The most probable explanation of this phenomenon is that this group of plants travelled to their present seats along the submarine plateau of western Europe when it was elevated above the surface of the water, but since the submergence of that plateau have died out in intervening regions where the conditions were not so favourable for their continued existence.

[1] Engler's *Versuch einer Entwickelungsgeschichte*, etc., i. 181.

CHAPTER IX.

THE IBERIAN PENINSULA.

1. *Outlines—Extent—Relief of the Land.*

UNDER the title of the *Iberian Peninsula* is comprised the extreme south-west corner of Europe, which is sharply defined and severed from the rest of the mainland by the lofty mountain wall of the Pyrenean range, whence it is known also as the *Pyrenean peninsula.* In point of size it ranks second among the European peninsulas, being exceeded only by Scandinavia. Its southernmost extremity, Punta Marroqui at Tarifa, lies almost exactly on the 36th parallel of north latitude. Cape Roca, at the mouth of the Tagus, projects into the Atlantic Ocean as the westernmost extremity of the European continent.

Two states of very unequal extent jointly occupy the Pyrenean Peninsula, *Spain* taking about five-sixths of the whole, while the remainder forms the kingdom of *Portugal.* Notwithstanding this political division, it is necessary to study the structure of the peninsula as a whole, since there is nothing in its physical features to justify this separation.

To form a correct idea of the conformation of this region in its main features, it should be regarded as a compact mass of land rising boldly out of the sea. It is in fact nothing more than an extensive upland plateau, overlooked by several mountain ranges and intersected by

numerous valleys cut out by the eroding action of rain and rivers.

The lowlands of the peninsula comprise no more than about the eighteenth part of the entire area, being restricted to narrow strips along the coast, together with the lower courses of the rivers, especially those of the Ebro, the Guadalquivir, and the Tagus. Were the sea to rise from 400 to 500 feet above its present level, these low-lying tracts would be flooded and converted into gulfs penetrating into the land, while the entire Peninsula would become a complete island, with the Pyrenees rising sheer out of the water along its northern seaboard. This range, in fact, which stands as a natural barrier between Spain and France, is separated by a broad relative depression from the highlands lying to the north of it, and hence must be orographically regarded as belonging altogether to Spain, with whose other mountain systems it is, moreover, closely connected.

Four principal mountain ranges may be distinguished as traversing the plateau. The northernmost, forming the Asturian or Cantabrian mountains, may be regarded as a western continuation of the Pyrenees, and runs nearly east and west, while the other three, the Castilian mountains, separating Old and New Castile, the mountains bounding the basin of the Guadalquivir on the north, and the Sierra Nevada bounding the same basin on the south, run, roughly speaking, parallel to one another in a general south-west and north-east direction. None of these ranges is continuous; they are each composed of detached mountain chains having the same general direction, and throwing off a number of spurs to different points of the compass. Between them lie several subordinate ranges, which will be noticed in the more detailed account of the peninsula contained in the following sections.

2. *The Pyrenees.*

The Pyrenees on the northern frontier not only form the grandest range in Spain, stretching for a distance of about 250 miles in an unbroken line from the Mediterranean to the Bay of Biscay, but when regard is had to their length as well as their height, they must be ranked next to the Alps among the mountain systems of Europe within the limit which we have adopted for that continent—a limit which, it will be remembered, assigns the Caucasus to Asia. As a barrier between north and south the Pyrenees, in consequence of the remarkable continuity in the main chain and the regularity in its height, are even more effective than the Alps. The chain is in fact a true sierra, or saw-like ridge of mountains, the depressions in which are only slight notches not much below the level of the neighbouring peaks. Throughout its whole length between the depressions at the extremities, round which the railways cross between France and Spain, there are only two passes practicable for carriages; one, the Col de la Perche between the valley of the Tet and that of the Segre, and the other, the Col de Somport or Port de Canfranc, a little to the west of the Pic du Midi on the old Roman road from Saragossa to the valley of the Oloron. Hitherto the Pyrenees have not been pierced, like the Alps, by any railway tunnel. Schemes are now on foot, however, for having this effected. After long negotiations the French and Spanish governments have agreed to the construction of two lines of railway through this frontier barrier, one to pierce the mountains at the Port de Canfranc, the other at Solanut to the south of Ariège.

The eastern or Mediterranean end of the Pyrenees is to be found at Cape de Creus, or more precisely at Cape Cerbera, whence the chain trends in a general

direction W.N.W., until it reaches the Atlantic at Cape du Figuier, near Fuenterrabia.

The ascent of Marboré, about the middle of the chain, where the gigantic Roland's Gap opens up an extensive prospect through the wild regions of the Spanish Pyrenees away to the blue plains of Saragossa, is as charming as it is dangerous at certain points. Close by is seen the Peak of Mont Perdu (11,030 feet), rising amidst the dazzling splendour of a lofty snow-clad

PASS OF PERTUS, EASTERN PYRENEES.

dome. These sublime phenomena in the marvellous regions round about Gavarnie are rivalled only by one other spot in the Upper Pyrenees. It lies near their eastern extremity, where the group of Maladetta, the Mont Blanc of the Pyrenees, with its many snow- and ice-bound crests, attains its loftiest elevation in the Peak of Néthou (11,168 feet), the highest summit in the whole range. Vignemale falls not far short of 11,000 feet; and besides, Marboré, the peaks of Néonvieille, and D'Estat, likewise exceed 10,000 feet in height.

Although the vegetation along their southern slopes

is richer than that of the Alps, the Pyrenees are far surpassed by the former in the volume of their waters, and in the extent of their snows and glaciers, as well as in the delightful contrasts often presented by the close association of these stern features with a vigorous vegetable life. A regularity of structure, here and there reaching a certain degree of monotony, is the distinctive character of the Pyrenees as compared with the more varied lines of the Alpine regions. From the two principal chains of the western and eastern Pyrenees advancing towards each other in a uniform direction from either coast, till the eastern end of the western chain is joined by a transverse ridge to the eastern chain near its western extremity, the spurs branch off with the regularity of the pinnæ of a fern leaf, thus forming a large number of short parallel valleys, crossed by others nearly at right angles.

In consequence of this regular formation the Pyrenees lack the picturesque variety so characteristic of the Alps. Moreover, owing to the absence of extensive parallel valleys, or, indeed, of broad valley formations of any sort, they also lack the charm of large lakes. In the higher regions alone there repose a number of small basins, hidden away in the wildest seclusion, fed by glaciers and snow-fields, and mostly ice-bound for the greater part of the year. Nor do the glaciers themselves, or, as they are here called, the *Sernelhas*, reach so far down towards the cultivated valleys as is the case in the Alps. The water system of the Pyrenees is also much less considerable, giving rise to only one important stream, the Garonne, which flows through part of France. The smaller mountain streams or *Gaves*, wind their way through narrow and precipitous gorges. There are further wanting the grand natural mountain passes elsewhere met with, the *pasos* or *puertos* of the Spaniards, with the

exception of the two above mentioned, being merely foot, or at most bridle paths for mules.

At the same time the Pyrenees enjoy advantages not possessed by any other mountain system. While the Alps separate the Germanic and Italian climates north and south of them, the contrast of two very different regions is presented by the Pyrenees when traversed along their course from east to west within a relatively narrow distance, and without sensible divergence from the same parallel of latitude. On the west side, in the land of the Basques, begins the mountain system, with an undulating hilly district of granitic, Silurian, Devonian, and Carboniferous rocks, its wooded heights recalling the scenery of the central German highlands. But towards the shores of the Mediterranean the landscape assumes an African aspect. Here rise bare white limestone walls of Miocene and Cretaceous strata, overlooking cork and olive groves and vineyards, their fruit glowing with the fire of the south, while extensive sandy plains are fringed with the strange but majestic aloe, and the tamarisk with its bushy green foliage. In a word, we have here contrasted the scenery of central Germany and Algeria on the same parallel of latitude and within a very limited area.

In the Central Pyrenees, in the language of Ritter "the sublime and lovely crown" of the whole system, our attention is riveted especially by those rocky amphitheatres, characteristic of so many mountain systems, but nowhere better seen than here, the *cirques*,[1] or *ouelles* (*olla*, or *pot*), by which latter name the local patois indicates the caldron-shaped formations which impart to the intersecting valleys their peculiarly imposing background. Rock-walled recesses assume their grandest proportions

[1] In the Highlands of Scotland such cirques are called in Gaelic *coire*, a caldron.

on the frontiers of Spain and France, in the limestone district of Marboré at Gavarnie, a wretched Pyrenean village (nearly 5000 feet above the sea), which, thanks to its majestic rocky amphitheatre, has acquired a European fame, such as that conferred on Chamouni by Mont Blanc and its gigantic ice-streams. In the whole Alpine region there is only one spot at all comparable to the Pyrenean cirques—the upland valley of Leuk at the Pass of Gemmi, encircled by the bare walls of the Daub and Platt Horn.

The abnormal structure of the cirques has given rise to many hypotheses regarding their origin.[1] The smaller mountain recesses of this sort sometimes possibly but very improbably point to the falling in of caverns as the cause of their peculiar shape. But it is impossible to believe that this theory is applicable to the mighty *oules* of Gavarnie, Troumouse, Bielsa, etc. So much, at least, is certain, that cirques are characteristic of all the European and other mountains where glaciers are, or where they have been in comparatively late geological times, such as the Black Forest, Switzerland, the Highlands of Scotland, Cumberland, and Wales.

3. *The Northern Provinces.*

South of the Pyrenees stretch the Aragonian lowlands intersected by the Ebro, which is here joined by several not inconsiderable affluents from the southern slopes of the Pyrenees. Towards the east the Aragonian lowlands are severed from the Mediterranean by a lofty ridge, which, in the north, develops into a real highland region, partly formed of granitic and other crystalline rocks, merging with the eastern extremity of the Pyrenees. These highlands form the ancient province of *Catalonia*,

[1] See Prof. Bonney "On the Formation of Cirques," *Quart. Journ. Geol. Soc.*, vol. xxvii. p. 312, 1871.

and in order to reach its delta on the Mediterranean, the Ebro, which nearly throughout its whole length flows through Miocene strata, has been obliged to cut its way through the Catalonian hills in the district between Mequineza and Tortosa.

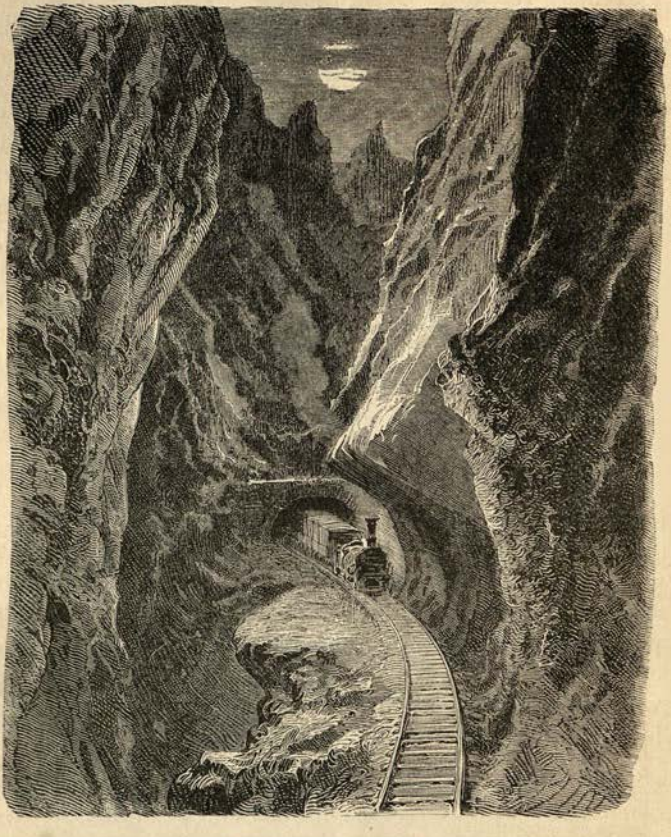
Following the upward windings of the yellow Ebro we see rising to the north the mountains of the Basque provinces, forming the western continuation of the Pyrenees, and the eastern section of the Cantabrian or Asturian mountains which skirt the north coast of Spain. This chain runs at an elevation of nearly 9000 feet from Navarra to Galicia. Between the Minho and its affluent the Sil it bends southwards, thus merging in the high tableland-region which fills the whole space between the Minho and the Douro both in Spain and Portugal, and in the latter country including the two small provinces of *Entre Douro e Minho* and *Tras os Montes.*

Galicia also is a hilly region, with many leafy woodlands, pleasant meadows, a mild climate, in which even southern fruits grow to perfection, while many tracts present a decidedly picturesque aspect. A lovely sight is offered especially by the walnut and chestnut woods, whose fruit forms a profitable article of export. *Asturias,* on the other hand, is an almost inaccessible Alpine region, with steep and jagged mountain ridges, luxuriant grazing lands, and fertile well-watered valleys.

4. *The Central Highlands and Plateaux.*

Flanking the Cantabrian chain on the north is the upland plateau of *Leon* and *Old Castile,* whose principal stream is the Douro, which reaches the sea near the commercial port of Oporto, the chief centre of the Portuguese wine-trade. Between its upper course and that of the

Ebro the western limits of the Iberian water-parting rise to the not inconsiderable range of the Celtiberian moun-



GORGE OF PANCORBO.

tains, or *Sierra de la Demanda,* at whose western foot lies the city of *Burgos,* one of the coldest spots in Spain, and formerly the "state prison of the kings of the land." To proceed from this point northwards, that is, to the Ebro

valley, we must cross the ravine at Pancorbo known as the *Gargantas de Pancorbo*, which presents a wild and extremely romantic view. For a distance of some four or five miles enormous masses of rock in some places rise abruptly from the ground, in others incline so much forwards from the perpendicular as almost to meet overhead. To the north of the Gargantas also we come upon labyrinths of bare rock, and the whole region presents altogther a very savage aspect.

Very different is the tableland of Old Castile, in the north of which are situated several famous localities, such as the old but now ruined and desolate Roman cities of *Palencia*, *Leon*, and *Astorga*, and south of them *Valladolid*, *Zamora*, and the renowned university town of *Salamanca*. Here reigns a dreary monotony, reminding the traveller of the parched tablelands of La Mancha in New Castile, or even of the sandy wastes of Sahara. This desert tract of Old Castile is traversed by caravans of mules, whose distant approach is revealed by the clouds of dust accompanying them. We unwittingly recall the Spanish saying, according to which "A lark that would fly over Castile must take its food with it."

The southern limits of this tableland of the Douro are formed by the ridge of the Castilian Sierras, with a mean altitude of about 8500 feet. These mountains are disposed in four clearly-defined chains, in some places rivalling the magnificence and romantic wildness of the Swiss Alps. Proceeding from west to east there rises the enormous mountain wall of the *Serra da Estrella* ("Starry Sierra") in the Portuguese province of Beira; the *Sierra de Gata;* the rugged rocky walls of the *Sierra de Gredos*, sinking abruptly towards the south, but level on the top, with alpine pasture lands, lakes, and a little glacier; lastly, the *Sierra de Guadarrama*, whence flows down to the Tagus the little *Manzanares*, an insignificant

stream on which is situated the Spanish capital, *Madrid*, in the centre of the dreary tableland of New Castile, and almost in the geometrical centre of the peninsula.

Speaking generally, the New Castile tableland presents everywhere the same dreary aspect as that of Old Castile, and it is not a little remarkable that these boundless tracts have exactly the same character in winter and summer—always and everywhere bare, barren, and burnt up. The tableland is divided by the *Mountains of Toledo* into the northern and southern plains of Toledo and La Mancha, the former watered by the Tagus, the latter by the Guadiana; and these mountains are continued westwards into the Spanish province of Estramadura by the *Sierra de Guadalupe*.

5. *The Western and Eastern Regions—The "Coast Steppe."*

Between the 40th and 41st parallels Portugal forms a plateau, sloping in terraces towards the north, with a mean elevation of perhaps 1900 to 2000 feet. These Beira highlands may be regarded as the south-western corner of the Old Castile plateau. On the other hand, the southern Portuguese province of Alemtejo is traversed partly by a western extension of the mountains of Spanish Estremadura and partly by the valley of the Guadiana, and in the north it has nothing but insignificant elevations very gradually sloping down to the west coast.

Proceeding eastwards from the plateau of La Mancha, we come upon the Iberian highlands, between which and the Mediterranean stretch the provinces of Valencia and Murcia, embracing a considerable strip of coast, which may justly be described as a "European Africa." In it is situated the port of *Alicante*, close to the edge of an arid salt steppe, forming part of the great steppe region of the

south of Spain, which has been named by Willkomm the "Coast Steppe."

This is by no means a uniform plain, but rather an undulating country, above which, towards the north and west, rise isolated mountain masses, assuming beautiful forms and glittering with the most brilliant hues, but apparently destitute of vegetation. Apart from a few date-trees and fig plantations round about the few scattered flat-roofed *caserios*, trees are nowhere to be seen, and one begins to wonder how so many people can exist in these bare, arid tracts, which are yet, comparatively speaking, somewhat thickly inhabited. But the cornfields, which lie in the hollows watered by *norias* or bucket water-wheels, are concealed from view, though they are found nearly always lining both sides of the highway. The farther we go from Alicante the more African becomes the aspect of the land. There first appear, right and left of the highway, clusters of palms, succeeded by palm-groves, varied with dazzling white caserios. These caserios have but few windows, but on their flat roofs may often be seen a half-conical baking oven, just as on the Moorish houses in Morocco. As the traveller approaches Elche the palm-groves increase in size, the ground between the trees being densely covered by an undergrowth of pomegranate bushes, while fields of corn and lucerne-grass, olive and carob-bean plantations, proclaim the increased fertility of the soil, and bring us directly to the famous palm groves of Elche.[1]

6. *Andalusia—Valley of the Guadalquivir.*

Between the tableland of La Mancha and Andalusia extend the numerous bare but low ridges of the rugged *Sierra Morena*, forming the main chain of the Andalusian

[1] See M. Willkomm's *Spanien und die Balearen*, Berlin, 1876.

parting range. The famous rocky gorge of *Despeñaperros*, 2444 feet above the sea-level, is now crossed by the railway connecting the valleys of the Guadiana and Guadalquivir. The latter is the great water highway of Andalusia, flowing by the cities of *Cordova* and *Seville*, and disemboguing not far from *Jeres* and *Cadiz*.

Andalusia is the garden of Spain, and to it are mainly applicable the glowing descriptions of travellers—descriptions which are too often unfairly extended to the northern highlands of the peninsula. Here the loveliest spot, the very soul of the picture, is the valley of *Granada*, at the foot of the majestic coast-range of the Sierra Nevada. In this favoured land spring is well advanced so early as the month of February. Owing to the prevailing moderate temperature there is here developed the most marvellous blending of northern and southern vegetation. Being flanked towards the south by the lofty Sierra Nevada, the city of Granada, notwithstanding its southern position, seldom lacks cooling breezes, even in midsummer. On the mountain tops, especially on the Mulahacem peak, the culminating point of the Iberian peninsula (11,660 feet above sea-level), are visible vast snow-fields, which never quite disappear even beneath the glowing rays of the July and August suns. One small glacier, the most southerly in Europe, still remains in the Sierra Nevada, 2000 feet beneath the summit of Mulahacem, in the precipitous Corral de la Veleta. The ground is overgrown with a delicate green vegetation, with ivy and the loveliest little flowers, and even entire fields of violets, enclosed by long lines of myrtle hedges and twining rose bushes with deep-red blossoms. Here also blossom the apple and the pear tree, and even the strawberry, by the side of the orange, the cactus, and aloe, laurels, palms, and avenues of the cypress and cedar. And amidst it all the eye is refreshed by the sight of

the magnificent system of irrigation inherited from the Moors.

Towards the east the Spanish plateaux merge into a highland region from 2000 to 5000 feet in height, overlooked by scattered peaks of greater altitude, which are gathered into groups, and form connecting links with the lofty mountain masses occupying the southern limits of the peninsula. In these eastern highlands lie the sources and water-partings of nearly all the streams of the Peninsula, which here take their rise, and flow to the west and east. The general water-parting must thus be regarded not as a real sierra or mountain chain, but only as an elevated district, which attains in various places various degrees of altitude. Beginning at the source of the Ebro it forms a semicircle, running first east and then south and west as far as Cape Marroqui, far south of which lies the Sierra Nevada, which forms the loftiest part of the Andalusian coast range.

South-eastwards from Granada stretches the mountainous region of Alpujarras or *La Alpujarra*, about 50 miles in length, "sending out its sierras like so many broad arms to the Mediterranean." It is a region as romantic as mountainous—romantic not only in virtue of its grand and picturesque scenery, but also in consequence of its historical associations, taking us back to the time when its heights were "thickly sprinkled with Moorish villages," and were the scenes of fierce battles celebrated in the Spanish ballads, when the Moors were fighting for their religion and their independence against the soldiers of Ferdinand and Isabella. Few other spots on the face of the globe are said to be so highly favoured by nature. On the crest of the sierra flourishes the aromatic camellia, together with the rarest lichens; on the higher slopes the trees and shrubs of the north; lower down the olive and the vine; and in the valleys

even the banana, cotton, and the sugar-cane. The flowers and fruits of La Alpujarra are the most highly prized in the province of Granada.

7. *River Systems.*

The general slope of the Iberian plateau being to the west, and the water-parting forming, as just intimated, a semicircle with the convexity to the east, it follows that the principal rivers of the peninsula flow westwards. Only in the angle between the upper half of the semicircular water-parting and the Pyrenees is there room for a considerable river, the Ebro, on the east side. In general the Iberian rivers are not of great volume in proportion to their length, or of great use for navigation. The largest in respect of the volume of its waters and the most important as a navigable stream is the Guadalquivir, which in the upper part of its course enriches the province of Andalusia, but in its lower course winds sluggishly through pestiferous swamps uninhabitable by man. Steamers ascend as high as Seville, but the navigation is chiefly conducted by means of barges. The Guadiana, the next great river to the north, is the poorest as regards volume of all the Iberian rivers, and is navigable for only about 35 miles above its mouth. In the upper part of its course it disappears underground for upwards of 30 miles, revealing its existence only here and there by small lakes, which the Spaniards call "the eyes of the Guadiana." This river and all the other great rivers to the north, the Tagus, Douro, and Minho, form during part of their course a portion of the boundary between Spain and Portugal. The Tagus is navigable for 115 miles above its mouth, and the Douro is important to commerce from the fact that it flows in the lower part of its course through the richest wine country of Portugal, the produce

of which it brings down to Oporto in flat-bottomed boats; but even this, though a noble stream, traversing in certain places some of the most magnificent rock scenery in Europe, is for the most part difficult of navigation on account of the number of rocks and sandbanks in its course. On the eastern side the streams in the south, the Segura, Jucar, Guadalaviar, etc., all flow in their upper parts through rugged valleys, sometimes through gorges of the most picturesque kind, and, though of hardly any use for navigation, are all of great value as sources of supply for irrigation canals. Even the Ebro is more important in this respect than as a navigable stream. Its bed is rocky, and its current above the influx of the Segre, its principal affluent on the left, much disturbed by rapids and cataracts, and though this evil has in part been remedied by the construction of a navigation channel, the Imperial Canal, from Tudela to a point 20 miles below Saragossa, yet the obstacles to navigation are still great. Its use as a source of supply for irrigation channels is, however, increasing, and its volume consequently diminishing, from year to year. Besides the navigation channel just mentioned, the Ebro at Tudela feeds an important irrigation canal, which is the means of covering with luxuriance a large and formerly sterile tract on the left bank of the river. So arid, indeed, is the greater part of its valley that, were it not for the irrigating channels derived from the Ebro and its affluents, Aragon and Catalonia, which are, in fact, fertile provinces, would be as barren as the Castiles.

Of the minor rivers of Spain the only one that claims special mention is the Bidassoa, forming the frontier line towards France. Apart from a few brackish lagoons along the coast, the peninsula has no lakes of any extent.

8. *Geology of the Iberian Peninsula.*

Granitic and gneissose rocks occupy much of the north-western part of the peninsula, stretching from Galicia through the northern provinces of Portugal, and extending far south into Estremadura. At the same time a great branch of similar rocks, forming the Sierras de Gredos and Guadarrama, extends eastwards from the main mass and separates the two Castiles. Granite also forms the axis of the Pyrenean chain, and occurs in patches in the southern part of the peninsula, especially in the Sierra Morena. In most places the granitic rocks are overlaid by *Silurian* strata. These strata are developed to an enormous extent in Western Spain, where they form a large part of Asturias, Galicia, and Leon; while on the southern side of the granitic area they reappear in New Castile, Estremadura, and Granada. The *Devonian* formation is but poorly represented, being nearly confined to the Cantabrian chain. The *Carboniferous* system, in like manner, finds its chief representative in the Asturias, where it consists mainly of limestones, the productive coal-measures being limited to a few small basins near Oviedo and Leon, while in the south they are developed to a small extent near Cordova. *Triassic* strata, with deposits of gypsum and salt, occupy a large area in Andalusia and Cuenca. Rocks of *Liassic, Oolitic,* and *Cretaceous* age occur in the eastern half of the peninsula, the *Chalk* being especially well developed and extending from Biscaya into Valencia. *Nummulitic limestone* is found in the Pyrenees, while other *Tertiary* strata occur in Seville and in Portugal. But the Tertiary period is mainly represented by *Miocene* deposits of vast extent spread over the great plateaux of the two Castiles and through the basin of the Ebro. The occurrence of these Miocene deposits forms indeed one of the most marked

features in the geology of Spain. Attaining in some parts to a thickness of more than 1000 feet, they represent the lacustrine matter gradually accumulated, through an enormous interval of time, at the bottom of two great fresh-water lakes which occupied the Castilian plateaux in the Mid-tertiary period.

In the limestone rocks of many parts of Spain *caves* have been discovered containing the remains of extinct and other mammalia associated in some cases with the remains of man. These may be generally referred to the *neolithic* period, or age of polished stone. Such ossiferous caverns have been found in Granada and Andalusia, but the best known examples are those at Gibraltar, which were explored by Captain Broome, Dr. Hugh Falconer, and Prof. G. Busk.

9. *Minerals of the Iberian Peninsula.*

From the days of the Phœnicians the mineral wealth of Spain has engaged the attention of the miner, and relics of ancient workings are abundantly scattered over the peninsula. *Lead* appears to have been in most cases the prime object of the quest. Valuable ores of this metal occur at Linares in the province of Jaen, south of the Sierra Morena, where the veins are mostly found in granitic rocks, though occasionally also in the neighbouring Silurian slates. There is evidence to show that the ores of this district were worked successively by Phœnician, Carthaginian, and Roman; and at the present day the mines of Linares are among the most important lead-workings in the world.[1] Other ancient workings for lead-ore are found in the neighbourhood of Cartagena, in the province of Murcia, while rich ores of the same metal

[1] *Report of H.M. Consuls on Manufactures*, etc., part xiv., p. 1307. 1882.

also occur near Almeria in Granada. Much of the Spanish lead-ore is argentiferous, but ores of *silver* itself were formerly worked at Guadalcanal and at Cazalla. Silver-mining is still carried on to a limited extent at Hiendelaencina in the province of Guadalajara, where the principal ore is a mineral of extremely local occurrence, called Freieslebenite. *Gold* was washed by the Romans from the sands of the Tagus, and was systematically worked by mining in Asturias, Galicia, Granada, and some other parts of the peninsula. The Arabs appear to have worked gold chiefly in the province of Jaen.

Vast deposits of *iron-pyrites* occur in the province of Huelva, and have been utilised from a very remote period. Workings for this mineral on a gigantic scale are still carried on at Rio Pinto and Tharsis in Spain, and at San Domingos in Portugal. The ore is a sulphide of iron containing about 3 per cent of copper, with a small proportion of silver and traces of gold. Enormous quantities are imported into this country, and treated in Lancashire, on the Tyne, at Glasgow, and at Swansea. The ore is first washed, whereby the sulphur is expelled and utilised in the manufacture of oil of vitriol; and from the "cinder," or calcined ore, the copper and other metals are extracted by wet processes. The waters issuing from the old workings at Rio Tinto yield metallic copper by precipitation with scrap iron.

The *iron-ores* of Spain occur chiefly in the province of Biscaya, and consist of hæmatite, or red ore, associated with brown and spathic ores, in limestones of Cretaceous age. The red ore is known as *campanil*, the brown as *rubio*. In 1881 not less than 2,800,000 tons were extracted from the districts of Matamoros, Triano, and Somorrostro, near Bilbao. *Zinc-ores*, consisting of blende, calamine and smithsonite—the sulphide, carbonate and silicate respectively—are found in large deposits in Santander; *tinstone*

occurs in the granite of Galacia; and ores of *manganese* are worked in the province of Huelva. Far more important, however, than these minerals are the ores of *mercury* which have been worked for centuries at Almaden ("The Mine"), in the province of La Mancha. The cinnabar, or sulphide of mercury, occurs in sandstones and slates of Silurian age, which are penetrated by diabase, while rocks with characteristic Devonian fossils are found in the neighbourhood. There is no proof that Almaden, although an old mine, was worked by the Romans, but it is known that cinnabar was carried from some part of Spain to ancient Rome, and there used as a red pigment (vermilion). Almaden is the most important quicksilver mine in Europe.

The *coal-fields* of Spain are unfortunately of very limited extent. Near Oviedo in Asturias is a small basin yielding several valuable seams of coal—anthracitic, semi-bituminous, and bituminous. To the north-east of Leon, near Sotillo, is another small field with beds of considerable thickness. The coal-field of Bélmez and Espiel, north of Cordova, supplies coal for smelting the lead-ores of Southern Spain. The little basin of Villa Neuva del Rio, north-west of Seville, is notable for showing the coal-measures resting on Silurian slates. In the province of Teruel there are three coalfields containing ten seams of coal, lignite, and jet, belonging to the Neocomian or Lower Cretaceous series. Spanish *jet* is largely used in Whitby, but is far inferior to the native product for which it is substituted. Portugal appears to be almost destitute of coal; a small deposit of anthracite, however, occurring at San Pedro de Cova, near Coimbra.

Petroleum has been worked in the district of Conil, about 20 miles from Cadiz, where deposits of *sulphur* also occur.

Rock-salt is found in various parts of Spain, but the

most notable localities are Cardona and Solsona, in Catalonia, where enormous deposits occurring in nummulitic rocks have been worked for centuries. Some remarkable deposits of native *sulphate of soda*, more or less pure, are found associated with Tertiary strata in the valley of the Jarama, a tributary of the Tagus, not far from Madrid, and at Lodossa on the borders of Navarre and Old Castile. The sulphate of soda is of considerable economic value, and finds use in glass-making and other industries. Valuable deposits of *phosphorite*, or phosphate of lime, occur in Estremadura and in Murcia, where they are worked for conversion into the superphosphate so largely used as a fertilising agent.

10. *Climate and Vegetation.*

A single glance at the rain-chart of Europe is enough to show the great deficiency of rainfall that characterises the Iberian peninsula as a whole. The parts chiefly affected in this way are the interior tablelands and the valleys of the Ebro and the Guadalquivir. The fact is a natural consequence of the superficial configuration and situation of the country. The extensive plateaux occupying the interior form in summer an area of superheated and consequently rarefied air, while in winter the air is correspondingly cooled and condensed. The result is that in the former season the general direction of the winds is from the sea on all sides towards the interior, in the latter from the interior towards the sea. In summer, however, when the winds are most heavily charged with moisture, the rain is condensed chiefly on the mountains that form the boundaries of the plateaux, and the Ebro Valley on the north is completely shut off from all the rain-bearing winds. The valley of the Guadalquivir, it is true, is then directly exposed to the

moisture-laden wind, but at this season the surface is so heated by the rays of the sun that the moisture is only condensed when it is forced by the mountains up to higher levels. In winter, again, when the winds blow chiefly from the interior tablelands, the air is necessarily dry. In the west and north-west, where the tableland is less continuous, the surface being broken up into mountains and valleys, the country receives abundance of rain at all seasons of the year from winds blowing in different directions from the Atlantic.

Taking Madrid as typical of the Iberian plateau, we find that this dryness of the atmosphere is strikingly shown by the average number of absolutely cloudless days in the year. Of such days there are as many as 129, as against 22½ at Greenwich. As on other tablelands and plains, where hot suns and clear skies prevail, the daily range of temperature is often very great. In July and August it amounts on an average to 31° F., and even in December to 16°.

The dearth of vegetation on the interior tablelands caused by this excessive aridity has already been noticed in previous sections. Large areas are occupied only by a continuous covering of esparto grass; but in the east, where the drought is even greater than in the western parts of the plateaux, there are vast tracts, forming true steppes, like those of Southern Russia, with no continuous vegetation of any kind. In these the soil is largely impregnated with salts derived from the gypsum which forms a large proportion of the underlying rocks, and hence almost the only vegetation to be seen consists of halophytes, or plants suited to a saline soil, mostly of a pale green colour, and only sparsely scattered over the land. Among the other peculiarities of the vegetation of the Iberian peninsula is the large number of endemic species (species found nowhere else) which the flora com-

prises, and more particularly the flora of the Pyrenees and the Sierra Nevada.

The southern parts of the Iberian tableland, especially La Mancha, Murcia, and Andalusia, are characterised in summer and early autumn by a dry haze known as *calina*. It is composed of the finest dust, and when at its height (generally in the month of August), is so dense that the sun shines through it only as a reddish disk shorn of its rays and glare, while the whole of the landscape is enveloped as it were by a dull gray cloak, which obscures objects from the sight until the observer comes close up to them.

The Spanish coasts suffer much less from malaria than those of Italy. As already mentioned, the tract at the mouth of the Guadalquivir is very unhealthy, and so too are the environs of Lake Albufera, near Valencia, where rice is cultivated; but with the exception of these parts the Spanish coast enjoys almost complete immunity from this scourge of the sister peninsula. Partly, no doubt, this is due to the drier character of the Spanish climate, but it is in a great measure one of the benefits which the modern Spaniards derive from the labours of the Moors, who by their irrigation canals, have made the rivers useful to man, so that where in Italy, Greece, and the Levant generally, swamps infect the air with their poisonous exhalations, the vegas are spread out on the Spanish coasts as smiling richly-watered gardens of the most luxuriant fertility.

11. *The Balearic Islands.*

Here may briefly be mentioned the *Balearic* and *Pituyse* islands, situated in the Gulf of Valencia, off the east coast of Spain, and in every respect belonging geographically to the Iberian Peninsula, from which the

nearest is distant about 60 miles. Of the Balearics the most important are *Majorca* (*Mallorca*) and *Minorca* (*Menorca*), the former with the capital *Palma*, the latter with the excellent harbour of *Mahon*. The other little islands forming part of this group call for no special mention. The Pituyse consist of the two islands of *Iviza* (*Ibiza*) and *Formentera*. The islands are mostly hilly, and on Majorca, the largest of them, the Silla de Torella rises to a height of 4940 feet, while the adjacent Puig Mayor reaches 4920 feet. They enjoy a healthy and mild climate, and are favoured with a fertile soil, growing all the products of Southern Europe. The plain encircling the industrious and populous town of Palma (60,000 inhabitants) presents an extremely agreeable prospect, being overgrown with almond, fig, mulberry, carob, and pomegranate trees, mingled with the fruits of more northern latitudes, such as wheat, barley, leguminous and other vegetables, which grow well beneath the shade of the trees. The date-palm, which gives its name to the town of "Palma," is not now so much cultivated as formerly. Minorca is remarkable for its peculiar megalithic monuments, called *Talayots*, somewhat resembling the Sardinian nurhags. The other members of the Balearic group are small islands and islets, known under the names of *Cabrera*, *Dragonera*, and *Conejera*.

The Baleares are supposed to derive their name from *βάλλειν* (*ballein*), "to throw," in allusion to the dexterity of their ancient inhabitants in the use of the sling. Majorca gives its name to the ancient tin-glazed pottery called *Majolica*, though it is doubtful whether this ware was ever really made in the island.[1]

[1] On the Balearic Islands, see Murray's *Handbook to the Mediterranean*, by Lieut.-Col. R. L. Playfair, 2d ed., 1882.

CHAPTER X.

THE ITALIAN PENINSULA.

1. *General Physical Aspect—Form—Outlines—Extent.*

ITALY, the central of the three southern European peninsulas, dividing the Mediterranean into nearly two equal parts, is the garden of this continent, the land of classic memories, where the very stones are eloquent of bygone times; the home of poetry and the arts, as well as of the sublimest natural scenery.

Famous beyond all other European lands both geographically and æsthetically, severed also from the rest of Europe by a mighty rocky barrier, Italy is regarded by those dwelling on this side of the Alps as a lovely Eden. From the remotest times it has ever presented irresistible attractions to the northern nations, who here seek a milder climate and enjoy the accumulated treasures of art and antiquity. And this region does undoubtedly possess most glorious advantages above many other lands. Its shores, studded with extremely fertile islands, form safe and spacious harbours, while the interior is watered by many noble streams. It is traversed in its entire length from north to south by an unbroken mountain range, rich in valuable minerals, with its snowy crests tempering the scorching summer heats, and with its extinct and active volcanoes bestowing boundless fertility on the soil, while presenting sublime and awe-inspiring scenes to the eye.

Projecting like a tongue of land from the body of the

European mainland, Italy is split at its southern extremity into two promontories, the Calabrian on the west, and the Apulian on the east. The deep bight of the Gulf of Taranto, which divides them, thus assists in imparting to the peninsula that familiar form of a boot which finds its counterpart, though in a reversed direction, in the twin islands of New Zealand in the southern hemisphere. Washed by the sea on all sides except the north, Italy is severed by the Strait of Otranto, which is no more than 47 miles wide, from the Balkan peninsula to the east.

2. *General Relief of the Land.*

On the north the kingdom of Italy is bounded by the *Alps*, which from Styria and Carinthia strike westwards through Tyrol and Switzerland. Most of the famous summits of this range lie outside the political boundaries of Italy, the noblest mountains of the Italian Alps being the *Grand Paradis*, south of the Dora Baltea, which reaches an elevation of 13,271 feet, and *Monte Viso*, to the south-west of Turin, which gives birth to the sources of the Po, and attains an altitude of 12,585 feet.

Beyond the region of Monte Rosa the Alps curve southerly by Mont Blanc, Mont Cenis, and Monte Viso to the Maritime Alps, whence, lower in height, the mountains pass eastwards, overlooking the Gulf of Genoa, and merge into the *Apennines*, which form, so to speak, a long offshoot of the Alps, and traverse the whole of Italy almost as far as the very toe of the boot. Here and there portions of this long chain are from 2000 to 7000 feet in height, the culminating point of the Apennines being *Monte Corvo*, near the centre of the chain, which reaches an elevation of 9810 feet above the sea-level. In consequence of their great length, the general character of the Apennines is necessarily very diversified.

The Ligurian section is mostly wooded, as is also the Etruscan division, though to a less degree. On the other hand, the Roman and more southerly divisions are almost destitute of vegetation, or covered at most with but a few scanty shrubs; for here the top layer of humus has disappeared, and the bare limestone now crops out everywhere. The complete destruction of timber on the Apennines, as well as on most of the other Italian mountains, has taken place since the time of the Romans, and has been attended with the most disastrous consequences. Owing to the absence of forests at the sources of the rivers, the moisture is no longer held in check, whence arise those periodically recurring inundations so destructive to the low-lying districts, and especially to the Roman Campagna.

Between the two great mountain chains of the Alps and Apennines expands a vast fertile tract, often briefly spoken of as the *Plains of Lombardy*, but in reality comprising the three distinct territories of Piedmont, Lombardy, and Venetia.

3. *The Lombardo-Venetian Lowlands.*

The present Lombardo-Venetian plain, including *Piedmont, Lombardy, Venetia,* and *Emilia,* occupies an area of more than 37,000 square miles, and ascends gradually towards the spurs of the mountains, which rise steeply in the north, and still more so in the west, but slope gently southwards. The small volcanic hills of the *Monti Berici* (1380 feet high), at Vicenza, and the *Monti Euganei* (1350 feet), at Padua, divide the whole region into the large or *Lombardian plain* on the west, and the smaller *Venetian plain* on the east. The former is contracted by the projecting uplands of Superga (2296 feet), near Turin, so that the rest of the plain becomes a narrow

tract, gradually rising towards the south to an elevation of 1640 feet. The *Lake of Garda*, or *Benaco*, is cut off from the plain by a series of hilly moraines deposited at the end of the great glacier that filled the valley, while the *Lago Maggiore* (*Verbano*) and the *Lake of Como* (*Lario*) are also encircled by the romantic lacustrine highlands of Brianza (1300 feet). Like the other great Alpine lakes,

LAKE OF COMO.

those just mentioned are remarkable for their depth. That of Lake Maggiore reaches 2666 feet, and as its surface is only 645 feet above sea-level its deepest part is about 2000 feet below it. In the Venetian plain there is no lake save the little *Lago Santa Croce* at Belluno.

The eastern limits of the great northern plain are fringed by a number of coast lakes or lagoons, in the midst of which rises the proud queen of the Adriatic, *Venezia la Bella*. A still larger lagoon lies to the south,

between the two main arms of the Po. This is known as the Valle di Comacchio, and is important on account of the great quantity of salt obtained from it, as well as for the valuable eel-culture carried on in its waters.

4. *The Ligurian Apennines.*

The southern limits of the extensive plain of the Po are formed by the Apennines. This range, as already stated, begins close by the sea-coast in the extreme west of the land, at a point where the Alps turn from the north to the east on the frontiers of France and Italy. *Liguria* is the still surviving classic name of this highland coast-district, which with its picturesque and abrupt rocky slopes forms the far-famed *Riviera di Ponente* and *Riviera di Levante* between Nice and Spezia. Hence we speak of the "Ligurian Alps," and their continuation the "Ligurian Apennines," the division between the two being more or less conventional. The latter here assumes the aspect of a perfect coast range, such as the Spanish Sierra Nevada, the South American Cordilleras, or the Californian coast range; that is to say, the range approaches close to the seaboard, sinking abruptly down to the water, whereas its inland side slopes very gently towards the valley of the Po. In any case, the western extremity of the Apennines remains a narrow ridge of moderate elevation.

The genial climate along the Ligurian seaboard altogether rivals that of the delightful shores of the Bay of Naples, and the invalid from the north wisely seeks a winter residence in such places as Nice, Mentone (both now annexed to France), Ventimiglia, San Remo, and Porto Maurizio on the Riviera di Ponente, or Nervi, Chiavari, and Spezia on the Riviera di Levante. The vegetation also of this coast is the same as in southern Italy. In Genoa and its neighbourhood we are, in fact,

in the south of Europe strictly so called, which really begins where our botanical maps mark the northern limits of the evergreen sub-tropical plants.

The Ligurian Apennines, at present crossed by the railway in two places, at Savona and Genoa, follow with their crests the line of the deep bight known as the Gulf of Genoa, whose romantic and precipitous shores are also skirted by a railway carried through endless tunnels and blastings over ground mostly obtained artificially from the cliffs here sinking abruptly into the water. But as it trends eastwards the main line departs more and more from the coast in order to follow a more direct easterly course.

5. *The Tuscan Highlands and Plains—Carrara and its Marbles—The Valley of the Arno.*

At the southern slopes of these eastern Ligurian Apennines there extends seawards the charming district of Lunigiana, watered by the little river Magra. Farther south, severed from the Apennines by the Vale of Garfagnana, and lying between it and the coast, rise the wild and gloomy limestone hills of the Apuan Alps, with the Pizzo d'Uccello, 6163 feet high, sloping southwards down to the Tuscan plains.

In the Apuan hills is quarried the far-famed white Carrara marble, and on their western slopes lies the town of *Carrara* itself, in the midst of hills thickly clothed with the olive, vine, and stone-pine (*Pinus pinea*, L.), and towards the east shut in by a crescent of rugged marble bluffs, forming a picturesque contrast with the southern vegetation of the sea-coast. The marble is chiefly worked in the neighbourhood of Carrara, Massa, and Serravezza, about 150,000 tons being annually exported. Most of the stone has a pale bluish hue,

and is more or less veined, but the purest is highly valued for statuary purposes. The marble was worked by the ancient Romans, and has ever since been prized by sculptors. It is in this material that the finest works of Michael Angelo and Canova were wrought. The geological age of this "metamorphic" limestone has been the subject of much dispute; but the officers of the Geological Survey of Italy appear to have determined that it belongs to the Triassic series. According, however, to M. Coquand, who has paid great attention to the subject, it should be placed in the Carboniferous group. Whatever may be the actual truth with respect to the Carrara marble itself, it seems to be certain that Carboniferous rocks lie on the coast not far to the west, which has been proved by the discovery of fossils in the so-called "limestone coal" of the lower Carboniferous formation.

The Etruscan Apennines we may take as beginning with their highest peak, Monte Cimone (7107 feet), understanding by the expression that section of the range which takes a decidedly south-easterly course towards the Adriatic seaboard as far as the source of the Tiber at Monte Comero (3828 feet). It forms an extremely interesting section of the Apennines, and is now crossed by one of the most imposing railways in Europe, running from Bologna to Pistoja, and attaining its highest elevation at Pracchia. This line follows at first the valley of the Reno, one of the many streams flowing mostly in parallel lines down the more gently-sloping northern side of the range to the valley of the Po. After surmounting the pass the line descends southwards along the far more abrupt slopes down to the Tuscan plains, at whose eastern extremity lies embedded the city of *Florence*. This Tuscan plain is, properly speaking, limited to the valley of the Arno, a stream which, with the Po and the Tiber,

forms one of the three really important rivers of Italy. Its course is mainly from east to west, though from its source at Monte Falterona (5407 feet), in the Etruscan Apennines, it makes a decided sweep to the south before finally trending westwards at Pontassieve. Below Pisa it seeks an outlet in the Tuscan Sea through the *Maremma*, that is, the marshy and very unhealthy strip of coast in which the Tuscan plain here merges.

The Maremma is the seat of lingering volcanic action, as abundantly attested by the numerous jets of steam and other heated vapours which issue from the ground. These vapours contain boracic acid, and in the beginning of this century Count Lardarel laid the foundation of a great industry by leading the vapours from the *soffioni*, or vents, into ponds, or *lagoni*, in which the boracic acid was condensed, and then utilised in the preparation of alum. Tuscany also possesses numerous brine springs and mineral waters; and valuable deposits of copper ore are worked near Monte Catini. The occurrence of pebbles, of jasper, and other hard stones in the bed of the Arno has led to the manufacture of the famous Florentine mosaic-work, which is mainly composed of these *pietre dure*.

6. *The Roman Apennines—The Abruzzi—The Tiber and its Tributaries—The Lake Region.*

Monte Comero and the sources of the Tiber are the starting-point of the Roman Apennines, which reach as far as the gorge of the Tronto, an Adriatic coast stream, and whose highest and most rugged section forms the *Monti Sibillini*, or Sibylline Hills. Like its farther continuation, the lofty chain of the Abruzzi Apennines, this range shows a striking tendency to hug the line of the Adriatic seaboard as far as *Monte Amara* (9000 feet high),

under the 42d parallel. But beyond the Pizzo di Sevo (8353 feet) it branches off into two parallel chains, the more easterly of which bears the most elevated peaks in the peninsular portion of the kingdom, including the *Gran Sasso d'Italia* (9545 feet), the *Rocca di Lipareto,* and *La Scalata,* while the western chain culminates with *Monte Velino,* 8157 feet high.

This region of the higher Apennines, limited westwards by the course of the little river Salto, forms the province of the *Abruzzi,* which before the unification of Italy acquired an evil fame from the brigandage and general lawlessness of its inhabitants. Both the Roman and Abruzzi Apennines are furrowed by innumerable little coast streams running parallel with the Adriatic.

Between the eastern slopes of the Apennines of Umbria and the Adriatic lies a strip of land, which from having been the frequent scene of contention between neighbouring states, is known as *The Marches.* On the north it joins the Romagna, while on the south it stretches towards Monte Gargano, which forms the "spur" of the so-called boot. The most important town in The Marches is *Ancona.*

The source of the *Tiber* lies in the Apennines at the foot of Monte Comero, and at no great distance to the east of that of the Arno. The two streams, however, pursue widely different courses, the Tiber taking mainly a southerly direction, so that its mouth and source lie nearly on the same meridian. The most important affluents on its left or east bank are the *Nera,* rising in the Roman Apennines, or more definitely in the Monti Sibillini, and the *Anio* or *Teverone,* which rushes from the Sabine Hills along its peculiar travertine bed over the picturesque falls of Tivoli, joining the main stream a little above Rome. On the right bank is the *Chiana,* connected by a canal with the Arno. The Arno and Tiber thus form two sides

of a triangle, resting on the western seaboard as its base, the whole space being occupied by a very diversified highland country, which is intersected by the *Ombrone*, the most important coast stream between the two main rivers.

The heights between the Arno and the Ombrone are chiefly known as the Tuscan Hills, while between the Ombrone and the Tiber there is a group of volcanic hills, among which rises the lofty Monte Amiata, 5680 feet high. Here lies the not inconsiderable *Lake Trasimene*, or *Lake Perugia*, besides the neighbouring lakelets of *Chiusi* and *Montepulciano*, famous for its vintage. *Trasimene* is a shallow lake, little more than 20 feet in depth, but having an area of about 46 square miles. *Lake Fucino*, formerly a much larger and deeper piece of water, has been partly drained, with the advantage not only of reclaiming the land, but of increasing the salubrity of the district.

The *Lake of Bolsena*, occupying an area of 42 square miles, and having a depth of 460 feet, lies in the midst of a volcanic area, and hence has frequently been regarded as an extinct crater. It is, however, more probably a basin of erosion, or possibly it may occupy an area of subsidence. Bolsena empties its overplus of water through the river Marta into the Mediterranean. To the south lie *Lake Bracciano*, whence issues the Arrone, and the little *Lago di Vico*.

Among the volcanic rocks of Albano, on the south side of the Tiber, is the *Lake of Albano*, occupying about $2\frac{1}{2}$ square miles, and having a depth of 466 feet. It is notable that a small crab inhabits this lake, thus suggesting former communication with the sea, though the water occupies the site of an old crater. Close to it is the small *Lake of Nemi*. Both of these Alban lakes are eased of their surplus waters by artificial tunnels.

7. *The Campagna.*

The Campagna di Roma is distinguished alike for its picturesque beauty and historic grandeur. A solemn calm, of late years broken from time to time by the shrill whistle of the locomotive, broods over this richly-coloured soil of the classic *Latium.* The Campagna, however, must not be regarded as a perfectly level plain, although extensive tracts of the Ager Romanus bear this character. Elsewhere it rolls considerably, the simple but noble lines of these undulations presenting a pleasant contrast to the monotony of the more level districts. The prospect southwards is limited by the marvellous outlines of the volcanic Alban Hills, culminating with Monte Cavo. Towards the east the gaze is arrested by the limestone walls of the Sabine heights, whilst in the near distance the interminable arches of the Aqua Claudia impart to the Campagna its peculiarly grand and uniform character.

Overhead this ravishing picture is canopied by that blue Italian sky which is not only of a sharper and more lovely hue, but also seems considerably higher and more expansive than is ever the case in more northern latitudes. The Italian horizon, also, is clearer, and suffused by a white light, forming a beautiful background to the objects rising in the far distance, which thus seem to be sharply outlined when contrasted with their appearance in our hazier atmosphere. As far as the eye can reach, it detects nothing in the Campagna except pasture-lands, the only animated figures in the landscape being the flocks of sheep or goats grazing on the slopes, with the solitary form of a shepherd in their midst. Here and there may also be seen a few wretched-looking horses, enjoying total freedom; and when unusually favoured by good luck, the traveller may perhaps meet a few mounted Campagnoli, with their never-failing iron-tipped

staves and goat-skin nether garments. A rising ground is occasionally crowned with a little shady grove of the Italian evergreen oak (*Quercus ilex*), though this is always a rare phenomenon in the bare, treeless, sunlit Campagna. But, on the other hand, there everywhere rise amidst the broad expanse ruins and shapeless fragments, whose weird and often inexplicable forms speak eloquently of the past. Occasionally, also, a solitary pine spreads its noble fan-like branches over the grave of buried memories, or else the deep foliage of the laurel glitters amongst the mouldering ruins. In the centre of this charmed spot stands the Eternal City, overtopped by the all-commanding dome of St. Peter's. But above it also the fever-gendering malaria too often wields its deadly sceptre. (See section on *Climate*, pp. 295-6.)

8. *The Pontine Marshes—The Sabine, Alban, and Volscian Hills—Naples.*

Towards the west the Roman Campagna merges into the equally unhealthy *Maritima*, stretching along the coast, whose southern extension in the direction of Terracina forms the *Pontine Marshes*, anciently called the *Pomptinæ paludes*, and so named from the old town of Pometia, which is no longer in existence. They extend along the west side of the Monti Lepini, or Volscian Hills, which, with the Sabine and Alban, limit the Campagna eastwards and southwards.

By the expression *Sabine Hills* is understood a western offshoot of the Apennines, but severed from them by the valley of the Velino and its tributary the Turano. They rise on the left bank of the Nera, running parallel with the Tiber in a south-easterly direction along the axis of the Italian peninsula. Here rises the Anio, leading to the famous town of *Tivoli*, the ancient *Tibur;*

and in the very heart of these hills nestles the no less famous town of *Subiaco*, known anciently as *Sublaqueum* —a name which it derived from the circumstance of its having been built below the lake (*sub lacum*) of Nero's Villas. It is at Tivoli that the celebrated falls of the Anio, already referred to, are situated, and still finer falls are produced at Terni by the waters of the Velino escaping into the Nera. The stone called *travertine*—a concretionary limestone, deposited from calcareous springs, and largely used near Rome for building purposes—is formed abundantly by the waters of the Anio; from its occurrence near Tivoli it was anciently called *Lapis Tiburtinus*, of which the modern "travertine" is said to be a corruption. At Terni this stone forms a natural bridge, like the well-known one at Clermont in Auvergne.[1]

The hills of Albano (*Monti Laziali*) are of volcanic origin, and perfectly isolated from the surrounding uplands. They preserve their crater forms in the so-called Campo d'Annibale, and in the lovely lakes of Albano and Nemi. At Ariccia, also, an extinct crater is distinctly visible.

South of the Alban rise the *Volscian Hills*, which are even now still avoided on account of the lawless propensities of their inhabitants. They extend southwards as far as the Terra di Lavoro, watered by the Garigliano (the classic *Liris*), where begins the favoured land of Naples.

A little to the south spreads the fertile plain known as the *Campagna Felice*, which begins roughly with the Volturno, the most considerable stream in southern Italy. Here by the steep hills of a lovely seaboard stands the witching city of *Naples*, the largest in the kingdom, overlooked by the neighbouring Vesuvius.

At the foot of Vesuvius an almost unbroken line of

[1] See Petermann's *Mittheilungen*, p. 329, 1881.

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townships stretches from Castellamare onwards, and even the neck of land separating the Bay of Naples from the Gulf of Salerno, and ending with the Punta della Campanella, is dotted with pleasant suburban retreats.

Facing the Punta della Campanella lies the rocky island of *Capri*, with its marvellous "Blue Grotto." At the opposite horn of the beautiful Bay of Naples are the volcanic islands of *Procida* and *Ischia*.

9. *The Phlegræan Fields—Vesuvius—The Southern Apennines.*

Ischia—the ancient *Pithecusa*—was the seat of volcanic activity in very early times, as recorded by Strabo and other classical writers. Its central point, the volcanic hill of *Epomeo*, rises to a height of 2520 feet. The continuance of the volcanic activity is shown by the constant ascent of hot vapour at certain places (*fumarole*), and it is a curious fact that two tropical plants, a fern and a cyperaceous plant, elsewhere unknown in Europe, grow in these spots under favour of the warm soil and exceptionally heated atmosphere. The action of subterranean forces is likewise manifested by frequent earthquakes. On the 4th of March 1881 200 persons on this island lost their lives through an earthquake, and little more than two years after (July 28, 1883) occurred the most disastrous earthquake known in Europe since that of Lisbon, destroying the town of Casamicciola, and causing the loss of about 1500 lives. The little isle of *Procida* (*Prochyta*) lies between Ischia and Cape Miseno, at the head of the Bay of Baiæ. In all the area around this bay the marks of volcanic action are so evident that the district is commonly known as the *Campi Phlegræi*, or the "Burning Fields." This region extends as far as the wooded mass of Posilippo, a little to the west of

Naples. Many of its extinct craters have been converted into lakelets, and in this chaotic district the fancy of the ancients placed the entrance to the lower regions.

Lake Avernus, near Pozzuoli, is a sheet of water about half a mile in diameter, which occupies one of the old volcanic craters. To the west of Pozzuoli is the conical hill known as *Monte Nuovo*, or "The New Mount," in allusion to its comparatively recent formation. This hill is 440 feet in height, with a basal circumference of more than a mile and a half; yet documentary evidence may be cited to prove that the bulk of this hill was formed in about forty-eight hours in the year 1538. Near Monte Nuovo is the larger but similar cone of *Monte Barbaro*, once celebrated for its wines.

The three marble columns still standing in the ruins of the so-called "Temple of Serapis," on the Bay of Baiæ, have often been appealed to by geologists in evidence of the oscillation of the ground in this volcanic area.

Proof of subdued igneous activity is strikingly afforded by the vapours of the *Solfatara*. This term is now applied to all hot springs emitting a mixture of aqueous and sulphurous vapours, and depositing sulphur at their mouths. Originally, however, the term was limited to the old crater at Pozzuoli, from the *bocca grande* or lowest depths of which hot exhalations, with a temperature of from 120° to 165° F., are discharged with great force. In these vapours Deville detected steam, oxygen, nitrogen, carbonic acid, sulphurous acid, and sulphuretted hydrogen. It is in volcanic districts also that chiefly occur the mephitic or carbonic acid fumes known as *mofette*. This term was originally the local name for the temporary exhalations of carbonic acid following on the eruptions of Vesuvius in the neighbourhood of Naples. Owing to its greater specific gravity this deadly gas remains in the

depressions of the ground, in caves, and in valleys. The best known of these mofette is that of the *Grotto del Cane* at *Lake Agnano* in the Phlegræan Fields.

A little to the east of the Phlegræan Fields, and almost in the centre of the beautiful Bay of Naples, rises the volcano of *Vesuvius*—a flattened conical mountain, 4160 feet in height. On three sides the cone is encircled by a ridge known as *Monte Somma*, while the intervening valley is distinguished as the *Atrio del Cavallo*. The hill of Somma represents the rim of an ancient crater, which was probably broken through by the great eruption of 79 A.D. Prior to this date the volcanic nature of Vesuvius had not been generally recognised, though for several years previously the surrounding district had been shaken by repeated earthquakes. Within the natural fortress formed by the pre-historic crater of Vesuvius the Roman gladiators under Spartacus took refuge during the Servile War in 72 B.C.

The first recorded eruption—that of 79 A.D.—was witnessed by the elder Pliny, who, being then stationed in command of the Roman fleet at Misenum, was attracted by the phenomena, and approaching too near to the scene lost his life in the volcanic exhalations. His nephew, the younger Pliny, has left an account of the eruption in the letters which he addressed to Tacitus. It was during this volcanic outbreak that the populous cities of *Herculaneum* and *Pompeii*, with the small town of *Stabiæ*, were overwhelmed and completely destroyed. The catastrophe was occasioned not by streams of lava, or molten matter, but rather by showers of ashes and streams of volcanic mud, which rapidly buried the ill-fated cities, and so completely protected their contents that the relics which have been exhumed present an unexampled state of preservation.

Since the earliest recorded eruption just referred to,

Vesuvius has frequently been the scene of volcanic activity, and the shape of its cone has been subject to repeated alteration. Of late years an observatory, under Professor Palmieri, has been erected on the mountain; and a railway now conveys the visitor to the summit.

In southern Italy the great range of the Apennines becomes irregular, the main section of the Neapolitan Apennines gradually approaching so perceptibly to the west or Tyrrhenian coast that the peninsula of Otranto seems like a lowland country when compared with that of *Calabria*, which is traversed in its entire length as far as Cape Spartivento by the Calabrian Apennines. The territory of Otranto or *Apulia* is in fact a coast region of no great elevation, poor in water but rich in Cretaceous limestone, the ground rising continually as we proceed westwards. West of the Gulf of Taranto the Apennine range may be said still to continue in a long spur towards Reggio, the highest part of which, trending south between the gulfs of Policastro and Taranto, exceeds 5000 feet in height for a distance of about 50 miles.

10. *Hydrography—The Po and the History of the Po Basin.*[1]

The whole of the northern plain of Italy is richly watered with rivers and canals, some of the latter being navigable, and serving to drain the marshes. Still the main channel of this water system is the Po, disemboguing with a decided delta in the Adriatic, and in its lower reaches connected by canals with the more northern river Adige. Its principal mouth is the *Po della Maestra*, which traverses the true delta of the river, but some distance above Ferrara it throws off another branch,

[1] "The River Po," by A. C. Ramsay, F.R.S., *Macmillan's Magazine*, December 1872.

MAP OF THE BASIN OF THE RIVER PO AT THE GLACIAL EPOCH.

London: Edward Stanford, 55 Charing Cross.

which again divides at Ferrara into the Po di Volano and Po di Primaro, encompassing the lagoon of Comacchio to the south of the main stream. It has also numerous tributaries both from the Alps on the north and from the Apennines on the south, so that even at Turin it is already a considerable stream. The northern affluents all take a more or less south-easterly direction, as, to mention the most important, the *Dora Baltea* and the *Dora Riparia*, the *Sesia*, the *Ticino*, the *Adda*, the *Oglio*, and the *Mincio*. The southern tributaries, which, though more numerous, are less considerable, flow, on the contrary, exclusively towards the north-east. Amongst them are the *Tanaro* in Piedmont, no mean stream, the *Scrivia* with its charming upper course, the *Trebbia*, the *Taro*, the *Secchia*, and the *Reno*. An exuberant fertility prevails almost everywhere in this region, occasioned by the richness of the soil and the streams and canals irrigating it in every direction.

The Po in its behaviour may be looked upon as a typical river, the sources of which are fed by the "aged snows" of the Alps, and by the heavy rains of the Apennines. Above Ferrara, where the Po receives the last of its affluents, it drains an area of about 26,800 miles, of which 15,850 miles consist of mountain lands, and 10,950 of land comparatively flat. As every one knows, it runs from west to east, through many a city famous in story, across the great plains of

"Fruitful Lombardy,
The pleasant garden of great Italy,"

till at last, charged thick with sediment, it passes onward through the mouths that intersect its muddy delta into the Adriatic. In this great valley, now so fertile, it has run for far more thousands of years than man can yet venture to attempt to number, though perhaps the time may come when even that feat may be attempted.

Long before the historic period, tens of thousands of years ago, but which geologists call recent, the great valley was an arm of the sea; for beneath the gravels and alluvia that form the soils of Piedmont and Lombardy, sea-shells of living species are found in well-known unconsolidated strata at no great depth. At this period the lakes of Como, Maggiore, and Garda may have been fiords, though much less deep than now. Later still, the Alpine valleys through which the affluents of the Po run were full to the brim with the huge old glaciers of the Glacial Period, which, debouching on the plains, piled up the enormous moraine of the Dora Baltea, 60 miles in circumference, in places 7 miles in width, and over 1600 feet in height. Others of almost equal importance lie lower down the valley, as at Garda; and the famous battle of Novara was fought on hills which, though now fertile, were once mere heaps of barren moraine rubbish.

In those early times the Po flowed from the ice-caverns of the giant glaciers—just as at the present day it does from their diminutive descendants, high up among the inner Alps; and the great lakes of northern Italy had no visible existence, for the valleys were choked to their watersheds on either hand by the ice of glaciers, which, now shrunken and small, have receded far up among the farther recesses of the mountains. No forests miscalled primeval then clothed the rocky heights, for all was white and barren, a waste of snow, unprofitable to the eye, had eyes been there to see it, but not unprofitable in reality, for the thick and ponderous glaciers were busy scooping out lake-basins, great and small, and grinding the rocks in their path to powder, which, transferred to the great river, was spread abroad in the valley to form the soil now worked by man on so many fertile breadths of tillage.

When we consider the vast size of the moraines shed from the ancient glaciers that fed the Po, it is evident that at all times, but especially during floods, vast havoc must often have occurred among the masses of loose *débris*. Stones, sand, and mud, rolled along the bottom and borne on in suspension, must have been scattered across the plains by the swollen waters; for it is the habit with large glacier rivers to be constantly changing their courses, and often disastrously to ravage the plains through which they flow.

It will thus be easily understood how the vast plains that bound the Po and its tributaries were gradually formed by the constant annual increase of river gravels and finer alluvia, and how these sediments rose in height by the overflow of the waters, and steadily encroached upon the sea by the growth of the delta; a process which, begun thousands of years before history began, has largely altered the face of the country within historic times, and is powerfully in action at the present day.

To persons accustomed to think of the world as having always been what we now see it, it is hard to realise such facts as these—facts, too, that only relate to a very small portion of a late minor epoch in the geological history of the earth. And yet how greatly suggestive they are! Through all this time (and long before) the mountains have constantly been wasting away, and their crests getting lowered; the valleys, so many of which send tributary streams to the Po, have been widening on the upper slopes and deepening below, at one time almost wholly by the power of ice, and now by the action of the petty glaciers which we are accustomed to esteem so large, combined with winds, frost, rain, and the torrents that tear along their bottoms. It has been estimated by Professor Geikie that the area drained by the Po is on an average being lowered one

foot in 729 years, and a corresponding amount of sediment carried away by the river.

When the day arrives in which the great Italian lakes, fulfilling the destiny referred to in the chapter on SWITZERLAND, shall be filled with alluvium, a new modification of the history of the Po may commence, and its delta and the filling up of the Adriatic will advance more rapidly than before.

All these considerations help to show, though only in part, how complicated is the history of any great river; but before closing this sketch something may be said about the later history of the Po.

It is hard to get at the historical records of the river more than two thousand years ago, though we may form a good guess as to its earlier geological history. Within the historical period extensive lakes and marshes (some of them probably old sea lagoons) lay within its plains, since gradually filled with sediment by periodical floods. Great lines of dikes, partly of unknown antiquity, border the winding river for a length of about 200 miles from Piacenza to its mouth, and throughout this course its breadth varies from 400 to 600 yards. Through all its many windings, from Chivasso downwards, alluvial islands diversify its course, and deserted channels here and there mark the ancient aberrations of the river. To guard against the devastating effects of floods, and to check such aberrations, the dikes were raised; and in this contest of man with Nature, the result has been that the alluvial flats on either side of the river outside the dikes have for long received but little addition of surface sediment, and their level is nearly stationary. It thus happens that most of the sediment that in old times would have been spread by overflows across the land is now hurried along towards the Adriatic, there, with the help of the Adige, steadily to advance the far-spreading alluvial flats that

form the delta of the two rivers. As the embanking of the river went on from age to age, so just in proportion has the annual amount of the formation of the delta been accelerated. But the confined river, unable by annual floods to dispose of part of its sediment, just as the dikes were increased in height, gradually raised its bottom by the deposition there of a portion of the transported material, so that the risk of occasional floods is again renewed. All these dangers have been much increased by the wanton destruction of the forests of the Alps and Apennines, for when the shelter of the wood is gone, the heavy rains of summer easily wash the soil from the slopes down into the rivers, and many an upland pasture has by this process been turned into bare rock. In this way it happens that during the historical period the quantity of detritus borne onwards by the Po has much increased; and whereas between the years 1200 and 1600 the delta advanced on an average only about 25 yards a year, from 1600 to 1800 the annual advance has been more than 75 yards.

The growth of the delta since the time of the Romans is proved by evidence of the best kind. The town of Adria, which in the Roman period was a maritime town, now stands on the banks of the Po more than 20 miles from its mouth. Similar changes in relative position indicate the advance of the land farther to the south (at Ravenna). But farther north there is equally good evidence of the encroachment of the sea on the land through local subsidence. The Lido (Latin *littus*, shore), facing Venice, is nothing but an old chain of dunes, through which the sea has forced its way. The islands on which Venice was built have sunk about 3 feet since the sixteenth century.

Besides the Po, the Adige, the other chief river of the Lombardic plain, is the only river in Italy of navi-

gable importance; and even it, though navigable for vessels of large size, as high as Trent in Tyrol, is navigable only with great difficulty in consequence of the great rapidity of its course. The country on its banks is much subject to inundations. The rivers of the peninsula proper are all comparatively short, and being already spoken of require no additional notice here.

As to the Italian lakes, we may here enumerate the principal. Beneath the southern slopes of the Alps are the Lakes of Maggiore, Lugano, Como, Iseo, and Garda; between the two main branches of the Po, the lake or rather marshy lagoon of Comacchio; in the Apennine region, Lakes Trasimeno, Bolsena, and Albano. For particulars about them it is enough to refer to the Introduction (where the question of the origin of the Alpine lakes is discussed), the previous sections of the present Chapter, the Chapter on SWITZERLAND, and the Appendix.

11. *Geology.*

The three areas into which Italy is sharply divided by nature correspond with, and in fact are due to, as many well-marked geological districts. There is first the mountainous region of the Alps in the north and north-west, which is really part of the great mountain system of central Europe, with which it can be best studied; secondly, the vast alluvial plain of Venetia and Lombardy, prolonged to the west and south into Piedmont, or *Piemonte*—"the foot of the mountain"—or district at the base of the Alps; and thirdly, the peninsula proper, the hills of which are connected with those of the first-named region by means of the Maritime Alps.

In the south-eastern part of the peninsula, from the Gulf of Taranto to the neighbourhood of the Strait of Messina, the mountain land consists chiefly of crystalline

metamorphic rocks, which cross the Strait and pass into the north-east angle of Sicily. Sicily itself consists mainly of Tertiary strata, through which appear, in a few localities, older rocks of *Permo-carboniferous*, *Triassic*, and *Jurassic* age.

The centre of the peninsula is composed largely of *Cretaceous* rocks, overlaid for great areas by *Tertiary* beds (Eocene and Miocene). A continuous band of these, fringed by an outer line of *Pliocene* deposits, ranges down the east coast, passing inland near Loggia, and reaching the sea again at the Gulf of Taranto. *Eocene* beds form a great part of the north of Italy between Florence and the plain of the Po. Farther to the south, through Tuscany and towards Rome, patches of *Miocene* or middle Tertiary strata diversify the country. In the central highlands of Italy the rocks have been bent into a series of folds, with a general N.W. and S.E. direction. These folds bring up the *Jurassic* rocks (Lias and Oolites) in many places from beneath the Cretaceous beds. Both formations consist very largely of limestone.

The older strata of the peninsula are confined to its western side, and occur there only in isolated areas. Of these the most important is that near Carrara, where the central part of the Apuan Alps is formed of Carboniferous rocks, around which come others, highly altered, which the Italian surveyors consider to be of Triassic age. In these the famous marble of Carrara occurs (see pp. 271-2).

It is also on the western side that the *volcanic* rocks are found. This is true equally of the more modern products, so well known in the Roman states and around Naples, and of the older igneous rocks, of which small areas occur in the south-west, in Tuscany, and near Genoa.

The newer Tertiary beds of Italy, and especially of Sicily, are of great interest from the large number of

fossils which they have yielded. The Arno valley contains certain lacustrine strata of late Pliocene, or more probably of post-Pliocene age, which contain the relics of various mammalia. The area in which they occur in the Upper Val d'Arno is about 12 miles in length by 2 in breadth, and the depression which the strata fill consists of Cretaceous and Eocene or lower Tertiary formations. The thickness of the overlying Pliocene beds is about 750 feet, the uppermost strata being of newer Pliocene age, 200 feet thick, while the remainder is formed of older Pliocene. The upper series consists of sands and conglomerate, containing the bones of *Mastodon arvernensis, Elephas meridionalis, Rhinoceros etruscus, Hippopotamus major,* besides species of deer, bear, hyæna, and *Felis,* and remains of coniferous trees.

Remains of teeth of the mammoth (*Elephas primigenius*) are found in many parts of Tuscany, mostly, it seems, in the so-called *pancchina,* a loose description of loam.

12. *The Minerals of Italy.*

Italy is but ill supplied with mineral fuel, and relies largely upon its imports from England. True bituminous coal seems to be absent, but *anthracite* occurs in rocks of Carboniferous age at several localities. In the Alpine regions the most important deposits are at La Thuile in the Val d'Aosta, at Demonte in the Val di Stura, and at Ovara in the province of Udine. It is found also in the basin of Calizzano, Genoa; and at Seni in Sardinia. At Cludinico in Frione there is a deposit in rocks of Triassic age, and Mesozoic coal occurs also near Selva di Progno, Verona.

Lignite is extensively distributed through parts of Italy, being known to occur in 281 communes distributed through forty-six provinces.[1] Some of this mineral is of

[1] *I Combustibili Minerali d Italia,* per G. Jervis : Torino, 1879.

Eocene and some of Miocene age, while certain deposits are of Pliocene and even post-Pliocene date. In the Alpine districts the most important deposits are those in the provinces of Cuneo, Bergamo, Verona, and Vicenza. Lignite occurs also in the Ligurian Apennines, and along the Mediterranean side of central Italy. The best varieties are found near Savona, Sarzana, Murlo, Pomarance, and Grosseto. There is also an Eocene lignite worked at Gonnessa in Sardinia. It has been calculated that at the present rate of consumption the deposits of fossil fuel known to exist in Italy will serve the country for about 250 years. Peat is extensively used in many parts of the country. *Petroleum* occurs in the Tertiary rocks of the Val de Taro, at Miamo, Monte Gibbio, and elsewhere; while *asphalt*, a solid bitumen, has been worked to a limited extent at Frosinone, Roccadarce, Roccasecca, and in the valley of Pescara. *Graphite*, or "black-lead," of poor quality, occurs in lenticular deposits in Piedmont, and in some of the higher Alpine districts.

The *iron ores* of Italy are by far the most important minerals of the country. They are raised chiefly in Elba and in the mines of Lombardy; but many of the old iron mines of the Val d'Aosta, of central Italy and of Calabria are no longer active. The Elban ores are partly smelted in the furnaces of Tuscany and Lombardy, and partly exported in a raw state from Rio to France, England, and North America. *Manganesiferous* iron ore is raised at Monte Argentara. *Manganese* minerals are found chiefly in the Eocene rocks of Liguria and Tuscany, while the anciently-worked deposits of S. Marcel in Piedmont occur in chloritic schists. *Iron pyrites* is worked at the Brosso mine, near Ivrea, and is used locally in the manufacture of sulphuric acid.

Copper ores of great richness are found in the serpentine rocks of Monte Catini in Tuscany, and are smelted

at Briglia, near Prato. Ores of low grade are extensively raised and treated at the Agordo Mine, near Belluna in Venetia, and at Ollomont in the Val d'Aosta. Valuable *lead ores*, in many cases highly argentiferous, are worked in Sardinia, and a fine ore is raised and smelted at Bottino, near Serravezza in Tuscany. For the most part the ores of lead are sent to Marseilles and to England. *Zinc ores* are raised to a limited extent in the Triassic dolomites of Lombardy, but the chief mines are in Sardinia, especially at Malfidano, where the calamine occurs in veins and bedded masses in limestones, probably of Silurian age. *Tin* is rare, but some interesting deposits have lately been worked at Monte Fumacchio, near Campiglia in the Maremma. *Antimony* occurs to a very limited extent, and ores of *cobalt* and *nickel* were formerly worked on a small scale.

Gold occurs in the form of veins of auriferous pyrites in many of the valleys of the Alps, especially in those descending from Monte Rosa and the Simplon towards the Lago Maggiore. The chief gold-bearing valleys are those of Anzasca, Antigorio, Antrona, and Toppa. Mining operations have been undertaken at various times at a large number of spots, and English capital is at present working some of the mines. Veins of gold-bearing quartz have been explored to a limited extent in the Val Corsente in the Ligurian Apennines. The precious metal is found also in the sands of the Dora Baltea, the Sesia, the Ticino, the Orea, and some other rivers of upper Italy. Formerly the gold-sands were an object of careful exploration, and their working may be traced back to classical times.

Silver is found in Italy in various forms, including the native metal, the chloride, the sulphide, and antimonio-sulphides. The ores are found chiefly in Sardinia, and are worked up with argentiferous lead ores. *Mercury*

occurs at Serravezza in Tuscany, where veins of cinnabar traverse limestones and schists of Eocene age. It is found also at Mount Amiata. An ore worked at Vallalta, near Agordino, is interesting as being a pyrites containing a small percentage of quicksilver.

Sulphur is a substance of immense importance to Italy. It is found chiefly in the island of Sicily, but occurs also in the Romagna. The sulphur ore of Sicily is for the most part simply roasted in crude kilns called *calcaroni*, when the sulphur separates in a fused state. In Romagna the process of reduction is less primitive, kilns of scientific construction being employed. Some of the sulphur is used in the vineyards of France and Italy, but the principal part is employed in the manufacture of oil of vitriol, this "brimstone acid" being in many cases preferred to that obtained from pyrites, inasmuch as it is not contaminated with arsenic.

Rock salt is obtained from the mines of Lungro in Calabria, and of Recalmuto, Cianciana, and Leonforte in Sicily. Salt is also derived from the brine springs of Volterra in Pisa and of Salso Maggiore in Parma. The latter springs contain salts of iodine. Mineral and thermal springs are abundantly distributed throughout Italy. Sea salt is obtained by evaporation of salt water at many points round the Italian coasts. The production of *borax* and *boracic acid* forms an important industry in the Maremma, as already explained (p. 273). Boracic acid is also obtained in the Isle of Vulcano. *Alunite* or *alum-stone* has been worked for ages in the trachytic rocks of Tolfa, and the production of "Roman alum" is still carried on at Civita Vecchia. *Asbestos* has of late become an article of considerable commercial importance, and is worked in the serpentine rocks of Valtellina.

Marble is yielded abundantly by the rocks of the Apuan Alps, and the famous quarries of Carrara have

already been described (pp. 271-2). The stone is largely exported, for statuary and decorative purposes, to France, England, and America. A beautiful *alabaster* or granular sulphate of lime is wrought at Volterra in Tuscany, and *serpentine* of various kinds is also worked in Tuscany, especially near Prato. *Granite* is quarried on the shore of the Lago Maggiore.[1]

13. *Climate—Flora and Fauna—The Malaria.*

Italy shares in the uniformity of summer temperature characteristic of the Mediterranean region generally. The mean summer temperature does not exceed 80° F. at any station in the whole kingdom, and, except in the elevated valleys of Piedmont, it is nowhere lower than 70°. The greatest extremes of temperature are in the Po basin; but even here, except in Piedmont, the mean winter temperature does not descend below 35° F. In this region the advantage of the shelter afforded by the northern mountain barrier is strikingly illustrated by the climatic differences between Milan and the Lake of Como, a few miles to the north. At the former station the winter temperature sinks to about the point just mentioned, but at Villa Carlotta on the Lake of Como the corresponding temperature is four degrees higher. Hence the rich Italian vegetation which strikes every one in descending from the north on the lakes of Lombardy, a vegetation which is not seen with the same luxuriance even in the plains a little way to the south. Regarding the rainfall of Italy nothing need be added to the account given in the Introduction of the general characteristics of the rain-

[1] The preceding sketch is partly taken from a memoir in the *Revue Universelle des Mines* for 1882 (p. 426), entitled "L'Industrie Minérale en Italie," by Jean Beco and Léon Thonard. For further information the reader may consult the exhaustive work of Mr. Jervis, *I Tesori sotteranei dell' Italia:* Turin, 1873-1881.

fall of the Mediterranean region, and there also we refer the reader for information relating to the occurrence of the sirocco and the mistral in the peninsula (see pp. 39-40, 42-4).

As to the vegetation of Italy, it must be borne in mind that its general aspect is greatly affected by the superficial configuration. The great extent of the mountains and highlands causes the truly Mediterranean vegetation, the myrtles, olives, and other evergreens, to be confined chiefly to the coast, especially in upper Italy, where the flora of the Apennines is composed of forms resembling and allied to those of central Europe more than to those of the Mediterranean generally.

The salubrity of the climate of Italy is greatly affected by the extent of the tracts in which the intermittent malaria fevers are prevalent during the summer. Recently this has been made the subject of a government inquiry, and since then an instructive map,[1] with text, throwing a great deal of light upon the matter, has been published. From this it appears that out of the sixty-nine provinces into which the kingdom of Italy is divided, only six are altogether free from malaria; these six being Genoa, Porto Maurizio, Florence, Massa e Carrara, Pesaro, and Piacenza. Of the remaining sixty-three provinces thirteen suffer only from a mild form of the fever, twenty-nine from a more severe form, and as many as twenty-one from the worst kind of malaria, which occasionally gives rise to fevers that prove fatal in twenty-four hours. In northern Italy this most pernicious form of the malaria occurs only in two districts —round the lagoons of Venice and in the neighbourhood of Brescia; in middle Italy it is the Tuscan Maremma (Pisa and Grosseto), the environs of Lake Trasimene, the Chiana depression in Perugia, and the Campagna of Rome,

[1] *Carta della Malaria dell' Italia, illustrata da Luigi Torelli, Senatore del Regno:* Florence, 1880.

that are affected by it; and in southern Italy, Apulia, the strip called the Tavogliere on the Gulf of Manfredonia, the environs of Paestum, almost the entire coast of Calabria and Basilicata, and the south of Sicily. How seriously prejudicial to the health of the inhabitants these malarial tracts are, will be apparent from the fact that in Sicily alone two-thirds of the railway officials are stated to be attacked by the fever every year, and to be ill on the average for eleven days, while on the Calabrian railways matters are said to be even worse. The cause of the insalubrity is found by the commission to consist in the marshy nature of the ground, and hence the remedies it proposes are the regulation of river-beds, the construction of irrigation works on their banks, the draining of the ground, and the planting of the Australian tree, the *Eucalyptus globulus*, which has already been introduced with so much beneficial effect into many unhealthy regions in different parts of the world, and among other places into the Campagna of Rome. In upper Italy, where the *E. globulus* does not thrive, the introduction of other two species of Eucalyptus, *E. amygdalina* and *E. resinifera*, is recommended for the same purpose.[1]

The animal kingdom presents nothing of special interest. The larger beasts of prey are nearly extinct; but the smaller fauna is plentifully represented in the south by such noxious creatures as scorpions, tarantulas, and mosquitoes, which in some places, especially along the coast, are a perfect pest. Among useful animals must be mentioned the silkworm, besides nearly all the domestic animals common to the rest of Europe; and to these must be added the buffalo of the Maremma as more peculiar to Italy.

[1] See Dr. Pietro Balestra, *L' igiene nella Campagna e città di Roma* (1875); and Dr. Gregorio Fedeli, *Sulle proprietà bonificanti e teropeutiche dell' Eucalyptus globulus*, 1876.

14. *Sicily.*

Beyond the narrow straits of Messina, about two miles in width, formerly dreaded for the terrors of Scilla and Charybdis, rise the precipitous shores of *Sicily*, the largest island in the Mediterranean, which it is now proposed to connect with the mainland by a submarine railway tunnel. Owing to its triangular shape, it was known to the ancients by the name of *Trinacria*. This island, like the Italian mainland, is, with the exception of a few low-lying tracts, such as the Plain of Catania, almost wholly occupied by mountains, which form a nucleus between Gangi and Nicosia, thence radiating in three main ridges to the three points of the triangle. The northern branch attains a considerable altitude, the western is lower, while in the southern the hills mostly fall off.

In contrast with the many abrupt elevations, the volcano of *Etna*,[1] north of Catania, on the east of the island, rises to a height of 10,840 feet, with a slope so gradual that the area of the base is estimated at several hundreds of square miles. It is only in its upper portion that its general outline becomes very steep; but on the western slope of the volcano there is a vast amphitheatre, probably the relics of an ancient crater, called the Val di Bove, the precipitous sides of which are partly 3000 feet in depth. These cliffs are entirely formed of ancient streams of lava, pierced by numerous dikes, the whole revealing a remarkable view of a considerable part of the interior of the mountain, and giving clear indications of its gradual growth by repeated eruptions. In the immense hollow are numerous minor eruptive cones, which have sometimes been called parasitic volcanoes, and great numbers of such subsidiary cones elsewhere dot the sides

[1] Mount Etna is known in Sicily as *Mongibello*, a name derived from the Latin *mons* and the Arabic *gibel*, "a mountain."

of the mountain, having been thrown up by various eruptions on its slopes. The most recent of these eruptions occurred on August 29, 1874, and was attended by remarkable changes in the shape of the mountain. Eruptions from the summit of Etna have long ceased, or are at least very rare, for so long and lofty is the upper part of the neck of the volcano that the explosive force of aqueous vapour seems, so to speak, to find it more easy to rend and force its way through the sides of the mountain at lower elevations, than to drive the molten matter up to and over the brim of the central crater.

The observatory on Etna is noteworthy as the highest building in Europe, its altitude being 9650 feet above sea-level.

On the flanks of Mount Etna are the cities of Catania and Aci Reale, together with sixty-two towns and villages, supporting on the whole a population of more than 300,000 inhabitants.[1]

The chief mineral product of Sicily is *sulphur*, which is largely worked in the Miocene rocks of Caltanisetta, Girgenti, and Catania. *Gypsum* and *rock salt* are found in association with the sulphur; *bitumen* and other carbonaceous minerals also occur in Sicily; *marbles* of great variety and beauty are yielded by the limestones of the north coast; a peculiar variety of *amber* is obtained from the Simeto; and *agates* are found in the beds of some of the rivers. Indeed it has been said that the mineral derives its name from the river Achates in this island.

Sicily was once an important granary, and large areas are still occupied by corn-fields. The olive, the vine, the orange, the lemon, and the citron are now largely cultivated, and an important industry has sprung up by the preparation of citric acid and its salts. The orange crop

[1] See *Etna: a History of the Mountain and its Eruptions*, by G. F. Rodwell. 1878.

is said to have an annual value of £2,000,000. Among other vegetable exports may be mentioned sumach, used in dyeing; manna, derived from a species of ash; liquorice, and saffron. The cochineal cactus flourishes throughout the island, and the papyrus of the Nile is found in the Anapus, near Syracuse, its only locality in Europe.

15. *The Lipari and other Islands.*

West of Sicily lie the unimportant islands of *Favignana, Levanzo,* and *Maretimo,* the *Ægusa* of the ancients, while north of Sicily, at a distance of from 10 to 40 miles off the coast, is the group of the *Lipari* islands, the *Æoliæ* or *Vulcaniæ* of the ancients.[1] The Liparis are all of volcanic origin, and consist of seven islands, with a few unimportant islets. *Lipari,* the chief island, is about 5 miles in length and 4 in breadth, consisting wholly of lava and scoriæ, and yielding large quantities of pumice-stone. *Stromboli,* with a cone rising to 3090 feet, has been from remote periods in a state of rhythmical eruption, ejecting at intervals of a few minutes clouds of steam illuminated by reflection from the glowing lava in the throat of the volcano. *Vulcano,* the most southerly of the archipelago, is almost quiescent, and chemical works have been established on the island for the preparation of alum, sulphur, boracic acid, and sal ammoniac. The other islands of the group are *Panaria, Salina, Filicudi,* and *Alicudi.*

Besides these islands, we encounter in going northwards the little *Pontian* group in the Tyrrhenian Sea, near the Bay of Naples, the principal of which is *Pontia* or *Ponza;* and still farther north, the *Tuscan* islands, in-

[1] For recent descriptions of these volcanic islands see Prof. Judd's papers in *The Geological Magazine* for 1875, and his volume on *Volcanoes,* 1881.

cluding *Giglio, Giannutri, Monte Cristo, Pianosa, Capraja,* and *Elba.*

16. *The Maltese Group.*

Between Sicily and the African coast lies the Maltese group, belonging geographically to Italy, and politically to England. The islands composing the group are *Malta* (the ancient *Melita*), *Gozo,* and *Cumino,* the last deriving its name from the cumin grown there. They are formed entirely of Miocene limestone strata, partly artificially provided with soil, with steep shores on the south, and without hills or rivers. The capital of Malta is Valetta, which has a fine harbour. To the west of Valetta is the Porto di San Paolo, the traditional scene of St. Paul's shipwreck, described in Acts xxvii. and xxviii.

One of the most interesting facts in the natural history of Malta is the discovery that at a comparatively recent period there existed in the island at least two kinds of *pigmy elephant,* the bones of which are found in deposits of post-Pliocene age. The so-called "donkey elephant" (*Elephas Melitensis*) was only between 4 and 5 feet in height, while another species, called *E. Falconeri* (Busk), was not more than $2\frac{1}{2}$ or 3 feet high. The discovery is of special interest, as proving that at the time indicated the islands must have been connected with the mainland, since such animals could not live on an area so circumscribed as Malta now is.[1]

To the north-west of the Maltese group, between Sicily and Cape Bon on the African coast, is the little volcanic island of *Pantellaria;* while in the neighbouring waters are the yet smaller islands of *Linosa* and *Lampedusa.*

[1] See Wallace, *Distribution of Animals,* chap. x.; Leith Adams, *Wanderings of a Naturalist in India,* p. 216.

17. *Elba.*

Off the coast of Tuscany, in the Tyrrhenian Sea, are several islands, of which the only one of importance is *Elba*, the *Ilva* of the ancients. Its length is about 15 miles, while its breadth varies from 2 to 10 miles. The chief town is *Porto Ferrajo.* Elba has been famous from remote antiquity for its iron mines, which are still a source of considerable wealth. The principal workings are situated near Rio, and yield an ore chiefly composed of *hæmatite,* or red oxide of iron. These deposits furnish the cabinets of mineralogists with crystals of *specular iron ore* and *iron pyrites* of surpassing beauty, while the granite of San Pietro yields magnificent crystals of *tourmaline.* The south-east promontory of the island terminates in Capo Calamita, so called in consequence of the occurrence there of *magnetic oxide of iron,* or the natural loadstone. The highest point in Elba is the granitic peak of *Monte Campana,* which rises to an elevation of 3340 feet.

18. *Corsica and Sardinia.*

To Italy physically belong, in a vague sense, the two large islands of Corsica and Sardinia, of which the first, however, forms part of the French dominions. The two islands were at one time connected by an isthmus across what is now the Strait of Bonifacio. A submarine plateau of no great depth joins Corsica with the Tuscan coast, while water of considerable depth separates it from France. Both Corsica and Sardinia are extremely mountainous; but, while in Corsica a lofty chain runs longitudinally north and south, seldom broken by deep ravines, the hills in Sardinia form independent groups culminating with Monte Genargentú, 6116 feet high. Their shores possess no natural harbours, but abundance of coral is found in

the Sardinian waters, and great mineral wealth in the interior of the island. The district of Iglesias, in the S.W. of Sardinia, was worked in the time of the Romans, and still yields large quantities of lead and zinc ores, chiefly argentiferous galena and calamine. The zinc-mines are indeed the scene of the most important mining operations in the Italian States. Valuable silver mines are worked in the district of Lanusei. Agriculture, however, is neglected, both in Sardinia and Corsica, which latter is characterised by fine forests and splendid mountain scenery. Monte Rotondo has hitherto been generally taken as the highest point in Corsica; but, according to the last survey of the French engineering staff, Monte Cinto now takes the first place. It is 8891 feet high, while Monte Rotondo reaches only 8775 feet.

Ajaccio, the birthplace of Napoleon, is the capital of Corsica; *Cagliari* that of Sardinia. It is notable that vast numbers of megalithic structures called *nurhags* or *nuragghi* are scattered over the surface of Sardinia, while none occur in Corsica. The nurhags are round towers, with sloping sides, generally placed on elevated sites. They are of unknown origin, but evidently of great antiquity.

The vegetable productions of Corsica and Sardinia present a mixture of European and North African types. The finest European conifer (*Pinus altissima*), which sometimes reaches a height of 160 feet, is indigenous to Corsica. Among the animals the most interesting is the *Mouflon* (*Ovis musimon*), which is still found both in Corsica and in Sardinia. The beautiful rock called *Napoleonite* or *Orbicular diorite*, occasionally polished as an ornamental stone, is limited to Corsica.

In Sardinia the geological formations chiefly consist of Silurian rocks, gneiss, granite, and various volcanic rocks, besides tracts of Miocene strata. In Corsica there

is also much granite and gneissic rocks, together with igneous masses and strata of Eocene and Miocene age. The great amount of disturbance which all the more ancient strata of these islands have undergone, combined with long-continued meteoric waste and degradation, has produced that wonderful combination of mountains and deep cliffy valleys for which these islands are celebrated.

Off the north-east coast of Sardinia lies the little island of *Caprera*, so named from the number of goats formerly existing there, and famous in recent times as the home of Garabaldi, to whom the island was presented by the King of Italy.

CHAPTER XI.

THE BALKAN PENINSULA.

1. *Outlines—Boundaries.*

UNLIKE Italy and Spain, the Balkan peninsula is destitute of any mountain barrier on the north separating it from the great mainland of central Europe. The best-defined physical boundary on the north is the line formed by the Lower Danube and its tributary the Save, which on the whole divides a mountainous region in the south from extensive plains on the north. The plain between this highland region and the outer slopes of the Carpathians forms the kingdom of Roumania, the physical features of which resemble for the most part those of the adjoining parts of Russia.

The coast is in most parts steep and rocky, especially on the west side; and the highly varied outline, with its fringe of mountainous islands, agreeing in its general character with that of the sea-board of Asia Minor lying opposite to it on the east, suggests the idea that the present distribution of land and water in this region is due to a comparatively recent submergence. Along the Dalmatian coast this subsidence seems to be still going on; and although in Greece and in the greater part of Asia Minor, as well as the Black Sea coast of the peninsula, the most recent variations in the coast-line appear to have been due to movements of upheaval, there can be little doubt that, for example, in the deep gulfs of Koron,

Marathonisi, and Nauplia, running up between the rocky peninsulas on the south, we have simply the lower parts of submerged land-valleys.

The longest inlet, that of the Gulf of Corinth or Lepanto, runs for more than 100 miles up between the peninsula of the Morea and the mainland; and it is a curious and interesting fact that this inlet bears a close resemblance to many of the Norwegian fiords, not only in its outline but also in the position of its deeper and shallower soundings, being deepest towards its upper end and shallower at and near its mouth. Possibly this may be due to the deposition of a relatively large amount of sediment in the sheltered waters where it opens into the Ionian Sea behind the islands of Cephalonia and Zante. From the Gulf of Ægina, or the Saronic Gulf on the east, this inlet is separated only by the narrow isthmus of Corinth, the piercing of which by a canal has long been a favourite idea with rulers and engineers. In ancient times a canal was actually commenced by Nero, though it was never completed, and of late years the project has been revived with more promise of success.

2. *Relief of the Land.*

The whole of the Balkan or Illyrian peninsula is of a very mountainous character, but the mountains are so diversely distributed over the surface that only two or at most three continuous ranges of considerable length can be made out. One of these is the range from which the peninsula takes its ordinary name—the *Balkan*. In the widest sense, this name, which is simply a Turkish word meaning a high range, is used to designate the mountains which are said to sweep in an irregular curve from the north of the Adriatic to the Black Sea; but when so used (and its use in that way is not without its con-

venience) it must be remembered that it does not designate a range of mountains, but only the northern part of the mountainous region that lies to the south of the Save and the Lower Danube. As the name of a mountain range, it is properly applied only to the chain starting as the Etropol Balkan from the east of the great basin of Sofia and running thence eastwards between Bulgaria and Eastern Roumelia to Cape Emineh on the Black Sea. In this sense the name corresponds to the ancient *Hæmus* in its narrower sense. The highest part of this range is in the west, between the Etropol and Shipka Balkans (about lon. 24° to 25° E.), where it is known by the name of the Khoja Balkans. Here the mean height is 6500 feet, and nowhere in this section does the height sink below 4500 feet. As a whole the range descends very gradually on the north towards the Danube, and it is only on the south side that it presents anything like a steep escarpment.

At various parts of the range the main chain is accompanied both north and south by parallel ridges. The Sredna Gora (5250 feet) and the Karaja-Dagh (3200 feet) stretch on the south parallel to the Khoja and Shipka Balkans, and farther east the Kitchik or Little Balkans, nowhere more than 2350 feet in height, extend on the north with an easterly and slightly northerly trend between the two head-waters of the Kamtchyk, one of the most considerable streams here flowing into the Black Sea. At this part of their course the Balkans diminish greatly in height, and the Little Balkans form only one of numerous well-wooded spurs that are here sent out both northwards and southwards.

As in most continuous mountain ranges, the passes form a very important geographical feature in the Balkans. In enumerating the principal, we may begin with the *Isker Pass*, which leads out of the depression where we

have assumed the Balkan range to commence. It may indeed be said that the Balkans proper are continued westwards across this defile, for to the west of it the continuity of the mountain range remains for a certain space uninterrupted, but it gradually breaks up into a maze of mountains which it is impossible to refer to any great range, whence it is convenient to assume the commencement of the Balkan range where we have done. When the name is extended to the mountains to the west of that defile there is a natural want of agreement as to how it should be applied, some making the Balkans proper stretch westwards to the mountains at the frontiers of Bosnia and Albania, others making them sweep round northwards to the Danube east of the Morava.

Still, as we have already indicated, the Isker defile may properly be included among the passes of the Balkans. It is a romantic mountain gateway, situated in the midst of vast crystalline formations, and rising, according to Kanitz, to the height of 4540 feet.

The Etropol Balkans are crossed to the north-east of Sofia by the *Orhanie* or *Orkhanie Pass*, while several lead over the Khoja. The most important, according to Kanitz, who crossed them all, are the *Kalofer* and *Teteve* passes. The highest are the *Rosalita* and the *Rabanica passes*, both upwards of 6000 feet in height. The *Shipka* or *Shibka Pass*, at an elevation of about 4000 feet, leads directly through the romantic gorge of the *Yantra* northwards to the industrious little Bulgarian town of *Gabrova*, and southwards to the "Thracian Shiraz," the far-famed and unique rose-fields of *Kezanlik*, which have acquired a world-wide repute from the attar of roses here manufactured on an extensive scale. The valley of Kezanlik, protected by gently-undulating hills from south-westerly gales, is covered with rose gardens and waving fields of yellow corn, interspersed amongst which are

numerous Osmanli hamlets, watered by sparkling rivulets and shaded by clumps of mighty walnut trees, their red-tiled roofs and white minarets irresistibly attracting the footsteps of the passing wayfarer.

From Kezanlik the more easterly *Travna Pass*, so called from the town of like name, leads northwards to the old Bulgarian royal city of *Tirnova*, charmingly situated on the Yantra.

TIRNOVA.

The last section of the Balkans, extending to Cape Emineh, is also crossed by several passes, such as "The Iron Gate" (*Demir Kapu*), upwards of 3000 feet high, at the point where the Little Balkans strike off to the north, the *Slivno* and the *Dobrol* (2132 feet).[1]

A less well-defined range is that which, under the name of the *Despoto-Dagh* or *Rhodope Mountains*, runs in a curve south-eastwards towards the Ægean Sea from near the western extremity of the Balkan range. At the

[1] See Prof. Toula *Eine geologische Reise in den westlichen Balkan*, pp. 85-112; and F. Kanitz *Donaubulgarien und der Balkan*, vol. ii. pp. 263-291.

northern extremity of this range, where it unites with the Rilo Dagh, stands Muss-alla, 9500 feet in height, the culminating point of the whole of the northern portion of the peninsula. Between the Rilo Dagh and the Etropol Balkans stands Mount Vitosh (7640 feet), one of the most remarkable peaks in the whole peninsula, a huge mass of syenite, exhibiting evidence of volcanic action, and containing an immense quantity of magnetic ironstone.[1]

The only other well-defined range of importance, both as regards length and height, is that of the *Dinaric Alps* the main chain of which, stretching from north-west to south-east, divides the Austrian crownland of Dalmatia from Bosnia and Herzegovina. The main features of the region covered by these mountains are similar to those described under AUSTRIA, in the section on the Karst. The loftiest summit in the chain is Mount Dinara, 5942 feet high, consisting of a mass of bare, dazzling white chalk, not, however, the soft chalk of north-western Europe, but the hippurite limestone mentioned in the Introduction as characteristic of the Cretaceous system in southern Europe.

Of the rest of the surface of the Balkan Peninsula, it would serve no good purpose to attempt a detailed description. It is enough to remember that it consists of a confused network of mountains, with peaks rising in every part, in Bosnia and Herzegovina, in Servia, Thrace, Macedonia, and Albania, in northern Greece and the Morea or Peloponnesus, to from 5000 to 9000 feet and upwards. Many of the short but lofty ranges in the south are, however, worthy of particular mention, on account of their ancient celebrity. Such, for example, are those enclosing the plain of Thessaly; namely, the Pindus range on the west, between Thessaly and Albania, Othrys and Œta in the south, with the famous pass of

[1] See F. von Hochstetter, in Petermann's *Mittheilungen*, 1872, p. 84.

Thermopylæ at the farthest extremity of the latter; Olympus, Ossa (now Kissova) and Pelion (now Plessidi) in the east. Olympus, 9750 feet in height, is the highest peak in the whole peninsula. Still farther south are the isolated Mounts Parnassus (now Liakura), Helicon (now Zagora), Cithæron (now Elatra); and in the Peloponnesus or Morea, in the heart of which lies the highland district of Tripolitza or Arcadia, a sort of basin encircled by hills, from which short ranges of mountains run out to the extremities of the minor peninsulas, there rise in the north-west Mount Erymanthos (now Olonos) and Cylene (now Zyria), and in the south Taygetus, the five principal peaks of which have obtained for it the modern name of *Pentedactylo*, "the five-fingered." Many of these Peloponnesian peaks attain a height of upwards of 6000 feet, and Mount Elias or Taletum, the highest of all, one of the peaks of Taygetus, reaches an elevation of 7904 feet. The extremity of Taygetus forms Cape Matapan, the most southerly point of Europe.

The most extensive of the plains of the peninsula is that in eastern Thrace, watered by the Maritza, between the Rhodope Mountains, and the coast range, called the Estranja Hills, which culminate in Gök-Tepe, nearly 4000 feet high. To the west of the Rhodope Mountains occurs another plain of considerable extent in Macedonia, completely isolating from the mountains just named the highlands of Chalcidice, with their peninsular prolongations, the most notable of which is the bold and naked marble-white headland of Mount Athos, or the Holy Mount, rising sheer out of the water to the height of 6350 feet. The only other plain of importance south of the Balkans is the one already mentioned, that of Thessaly, drained by the Salamvria, the ancient Peneus. From this plain the river makes its escape to the sea in the north-east through a wild but beautiful gorge, the

ancient vale of Tempe, between Olympus and Ossa, a gorge which the ancients believed to have been formed by some convulsion of nature, allowing the waters to escape from what was formerly a lake.

North of the Balkans the eastern part of Bulgaria and the district of Dobruja, now assigned to Roumania, are lowlands. The latter, indeed, contains a number of isolated hills, rising to the height of about 1500 feet, and, though for the most part of no great elevation, sinks on the north rather abruptly towards the marshy land belonging to the delta of the Danube, while it slopes more gently eastwards to a chain of lagoons on the Black Sea. The whole extent of these plains is remarkably arid. In summer the Dobruja is a burnt-up desert, in spring a muddy slough in consequence of the melting of the snows, yet it contains some fertile spots here and there, and affords pasture for numerous sheep and buffaloes, the rearing of which forms the chief occupation of the people.

3. *Hydrography.*

In consequence of the proximity of the Illyrian Alps to the western coast of the Balkan peninsula, most of the rivers which flow into the Adriatic and Ionian Seas are of inconsiderable length, and are too rapid in their flow to be of much service, save for the purpose of driving mills. Of these western rivers, the largest is the *Boyana*, which drains the *Lake of Scutari*, or *Skadar*, a body of still water in northern Albania, having an area of about 145 square miles. This lake is itself fed by the *Moratcha*, the principal river of Montenegro. Near the mouth of the Boyana is the outlet of another large river, the *Drin*, which flows for much of its course through a narrow valley hemmed in by precipitous walls. The Drin is formed by the union of two streams known as the White

and Black Drin, the latter of which takes its rise in *Lake Okhrida.* This is a sheet of water 95 square miles in area, situated on a plateau at an elevation of nearly 2300 feet above the sea level. Farther to the south lies the remarkable *Lake of Yanina* or *Joannina,* fed by springs, yet destitute of any visible outlet. It is divided into two basins drained by subterranean channels, called by the modern Greeks *katabothra;* the northern lake is supposed to give rise to the *Kalamas,* the ancient *Thyamus,* which flows into the Ionian sea, while the southern lake is probably connected with the river *Acheron.* In Bœotia lies another lake with subterranean channels for its outlets. This is *Lake Copais,* which is now in process of being drained.

The basin of the Ægean Sea, or the Archipelago, includes a number of considerable streams, of which the most important are—the *Vardar,* a river which rises on the Shar-Dagh, and after cutting its way through the deep passage of the Demir-Kapu, or Iron Gate, flows into the Gulf of Salonica; the *Struma, Strymon,* or *Kara-su,* rising on the slopes of the great mountain of Vitosh; and the *Maritza,* the greatest of the southern rivers, which collects its waters from the Balkans and the Rhodope Mountains, traverses the fertile plains of Roumelia, passing Philippopolis and Adrianople, and at length empties itself into the N.E. corner of the Archipelago. The river is navigable at certain seasons as high as Philippopolis.

The few streams that flow into the Sea of Marmora are for the most part mountain-torrents of no great importance. Among the numerous rivers that empty themselves into the Black Sea, the supreme position is of course taken by the *Danube* and its tributaries, representing the drainage not only of all the northern part of the Balkan peninsula, but also of the great Roumanian plain

which stretches northwards as far as the foot of the Carpathians.

Below the series of gorges described in the chapter on AUSTRIA (pp. 152-3), the Danube in flowing through the Balkan Peninsula makes a wide sweep to the south, traversing a broad stretch of country, which on its left bank has the form of a wide alluvial plain, while on the right rises a more or less precipitous terrace ascending to an extensive tableland furrowed by numerous affluents of the great river. The southerly sweep of the Danube in this part of its course is partly a result of the alluvial deposits brought down from the Carpathian and Transylvanian mountains by the tributaries on the left bank. These latter are far larger and more numerous than those rising in the Balkans south of the main stream. The alluvial loam covers the extensive Walachian lowlands, in some places forming terraces and embankments upwards of 40 feet high, and on both sides of the Danube the alluvial deposits have been spread over the underlying Miocene formations.

A monotonous löss terrace, underlaid by Miocene strata and destitute of timber, rises directly from the right bank of the Danube, gradually ascending over Cretaceous strata to the foot of the Balkans, and furrowed by numerous affluents of the main stream.

What may be called the present Danubian delta is of no great geological age, and so moderate in its rate of growth that it has so far done little more than fill up the acute-angled triangle, the two longer sides of which are formed by the deposits of an earlier period. Between Tultcha and Ismail the river forks off into two branches, of which the northern or *Kilia* arm carries off no less than seventeen twenty-sevenths of the whole body of water, while the southern or *St. George's* arm, known also as that of *Khidrillis*, discharges about eight twenty-

sevenths. Between those two branches is that of *Sulina*, which absorbs two twenty-sevenths. The Sulina, though the smallest, is the most important of these branches, since it alone is open to navigation.

Though swampy, the delta possesses woods of tall growth, that of Letti on the north, and Kara-Orman south-west of Sulina, whose dark masses produce a pleasing variety amidst the pale green elsewhere prevalent, and form a striking contrast to the fickle waters of the Black Sea. The marshy shores of the stream are also relieved by herds of buffaloes, flocks of wild duck, an occasional flight of herons, with here and there a few pelicans, while the stately stork abounds everywhere. Swarms of swallows, magnificent roller birds, tortoises, and other animals, add animation to a picture which must be seen to be fully realised.

4. *Geology—Mineral Products.*

Until lately our knowledge of the geology of the Balkan peninsula was more defective than that of any other part of the European continent. Thanks, however, to the labours of the Austrian geologists—especially Dr. F. von Hochstetter—a considerable amount of information has been obtained within the last few years, the extent of which is well shown in Dr. F. Toula's *Materialien zu einer Geologie der Balkanhalbinsel.*[1]

It appears that the great mountain-chains of Turkey

[1] *Jahrbuch d. K.-K. Geologischen Reichsanstalt*, Bd. xxxiii., pp. 61-114, 1883; see also Petermann's *Mittheilungen*, Bd. xxviii., p. 361, 1882, where will be found an excellent sketch-map illustrating the geological structure of the Balkan peninsula. In the summer of 1879, after Bosnia had come under Austrian administration, an examination of the geological structure and mineral resources of that province was made at the instance of the Austrian Government, and the results of the labours of the Commission appointed for the purpose are to be found in the work entitled *Grundlinien der Geologie von Bosnien-Herzegowina* (Vienna, 1880).

—the Balkans and the Illyrian Alps—consist of a nucleus of *granite*, associated with *gneiss* and various *crystalline schists*. A huge mass of *syenite*, rising from the plain of Sofia, forms Mount Vitosh; while numerous outbursts of *trachyte*—probably of Miocene age—have contributed to form the bold features of the Rhodope Mountains. *Serpentine* is exposed in many parts of Servia and in Bosnia.

Strata of *Devonian* age constitute the country on which Constantinople is built, and passing under the Bosporus stretch far away into Asia Minor. These Palæozoic strata are in parts fossiliferous, and are traversed by eruptive dykes. Rocks referred to the *Permian* and *Triassic* periods are exposed around the basin of Sofia, and onwards to the east as far as Eski-saghra. The Trias is also represented in Bosnia. Of other Mesozoic formations the best developed are those of *Cretaceous* age. They occupy a very large area on the northern slopes of the Balkans, whence they extend as broad terraces almost down to the valley of the Danube, and are found again strongly developed along the western side of the peninsula, where various limestone formations of Mesozoic age form long strips running from north-west to south-east parallel to the coast mountain-chains. *Eocene* strata, including Nummulitic limestone, are found in several localities—notably in the neighbourhood of Constantinople and of Varna on the Black Sea. In the north-east of Bosnia a peculiar flysch-formation, partly of Cretaceous, partly of Eocene, to a less extent of later Tertiary date, appears on the surface intimately associated with serpentine and gabbro. Deposits of *Miocene* or *post-Miocene* age occur in great force in many parts of the country, especially in the plains between Adrianople and the Sea of Marmora, and in the valley of the Danube. The *löss*, or "diluvium," is widely distributed as a surface-deposit.

It is supposed that the Balkan peninsula possesses mineral resources of considerable value, but the apathy of Turkish rule has hitherto prevented their development in most parts of the country. Bulgaria is rich in *lignite*, or brown coal, probably of Miocene age. At Belogradcik the coal is supposed to be Triassic; at Trevna, Liassic; and at Kunino, near Wratza, Neocomian. A small amount of brown coal is raised at Sikole in Servia. *Magnetic iron ore*, washed from the syenitic rocks of Vitosh, are worked and smelted in very primitive fashion at Samakof.

Servia is taking active measures to open up its mineral wealth, and it is known that the lead ores of this region were worked by the Romans, and afterwards by the Venetians. Heaps of ancient slags are still existing in the neighbourhood of Belgrade. *Argentiferous galena* is obtained from Kutchiana; *copper ores* are worked at Maiden Pek; and *manganese* near Kladova. The mines of Krupan have yielded argentiferous lead, antimony, and other ores. *Gold* is washed by the peasants from the sands of the Timok Valley, and to a limited extent in some other parts of the peninsula.

More than two thousand years ago, however, the gold deposits of the Balkan peninsula were worked on an extensive scale, and yielded enormous revenues to Philip of Macedon and Alexander the Great. The yield of Thracian gold in the days of Philip has been estimated at 1000 talents per annum. These mines were probably situated on the River Kilik, near Salonika. In Bosnia the gold-mines are said to have sometimes yielded in the time of Nero as much as 50 lbs. of the precious metal in a single day, and their working, after being discontinued at the break-up of the Roman empire, was resumed in the thirteenth century, and continued till the advent of the Turks in the fifteenth.

The *silver*-mines of Attica were also of vast importance to the ancients, and the gigantic piles of slag still existing are sufficient proof of the energy with which they were worked. At Laurium, in the southern extremity of Attica, there are ores of lead, silver, zinc, and copper, which occur in veins and contact-deposits, associated with mica schists and crystalline limestones, broken through here and there by igneous rocks. The greatest mining activity at Laurium was between 600 B.C. and the Peloponnesian War, when as many as 15,000 slaves were employed in the mines and smelting-works. Of late years some of the workings have been re-opened, but attention has been given not so much to raising raw ores as to smelting the old slags and mine-refuse, which were found to contain a considerable percentage—in some cases 10 per cent—of lead. The works are situated at Ergasteria.

Small quantities of *lignite* are raised in Greece, and *iron ores* have been worked in the isle of Serphos. The fine crystalline limestones of Pentelicus furnished the white *marble* with which the Athenians built their temples; while a handsome *green porphyry* found in Mount Taygetus was greatly prized as an ornamental stone of unrivalled beauty.

The recent Commission, referred to in the note on p. 314, has proved Bosnia to be, as was supposed, very rich in ores and other useful minerals, including coal. The last is chiefly found in various basins of Tertiary rocks scattered over the surface, and some of the deposits both of coal and other minerals are found near the valley of the river Bosna, so that they can easily be utilised by means of the railway from Serajevo to Brod on the Save. Seven coal-fields of the first rank are counted. A very valuable one, in which the coal occurs in seams of from 10 to 20 feet in thickness, and is very easily worked, is situ-

ated near Zenitza, a station on that railway. Brine-springs occur at various spots. For iron ores Varesh, north of Serajevo, is the most important locality, the ore-bearing bed lying on the surface. The dolomites and slates in the district to the west of Serajevo (round Foinitza and Kreshevo) have a very varied mineral wealth —ores of iron, lead, copper, manganese, antimony associated with silver, and of mercury, being all found there. The whole of this mineral region, as well as the coal-field above mentioned, has been declared to be state property.

5. *Climate, Vegetation, and Animal Life.*

The highly mountainous character of this peninsula gives it a climate more resembling that of Central Europe than the rest of the Mediterranean region. It will be observed on the rain-chart of Europe that the lines indicating the limits of the rainless summer and the exceptionally dry summer approach very close to one another in the south; and, as it is these lines principally that mark out the domain of the characteristic Mediterranean climate, it will be seen that it is chiefly the kingdom of Greece where such a climate prevails in this region. The greater part of the peninsula has, in fact, very abundant summer rains. Few regular meteorological observations are indeed available for the interior, but the accounts of travellers and residents in Servia, Bulgaria, and eastern Roumelia (the iron-works of Samakof), show that it frequently rains in summer for days, sometimes for weeks together,[1] and the observations that have been made at several stations in Bosnia since the period of the Austrian occupation likewise indicate that the summer rainfall increases from the coast inwards.[2] One cause of this

[1] Fischer, *Klima der Mittelmeerländer*, p. 8.
[2] *Ausland*, p. 657, 1883.

abundant summer rainfall of the interior is the fact that this peninsula has an extensive sea on the east as well as on the south and west. The moisture drawn up from the Black Sea in summer is condensed by the high mountains of the interior; and when we reflect that in former times the area of sea on this side was much larger than it is now, we may conclude that the rainfall in that epoch was even greater than at present, and hence that the highly diversified surface of this region is in great measure due to the energetic erosion by water of a former plateau which may once have vied in height with those of central Asia. The dryness of the level region in the north-east, already referred to, is due not only to its remoteness from the Mediterranean, from which besides it is shut off by high mountains, but also to the fact that the moisture from the Black Sea is carried by the prevailing winds farther to the south, and is condensed mainly by the mountains.

Snow-falls are likewise more frequent in the Balkan peninsula than in any other part of the Mediterranean region. In Bosnia snow-falls and frosts were found on an average of four years to recur at intervals as late as the middle of May at the height of 1500 feet above the sea. As to the climate of the north-west strip and the occurrence of the bora in that quarter, see AUSTRIA, pp. 143, et seq., and INTRODUCTION, p. 43.

The characteristic vegetation of the Mediterranean is naturally found along with the characteristic Mediterranean climate. The maquis, or thick-leaved evergreen shrubs (see INTRODUCTION, p. 48), are plentiful on the coasts, and on the Dalmatian islands and on the northern shores of the Ægean Sea they often cover large areas to the exclusion of vegetation of every other form. The absence of the olive at Constantinople,[1] in the latitude of central Spain

[1] Grisebach, *Vegetation der Erde*, i. 28.

and southern Italy, is an interesting illustration of the reduction in temperature spoken of in the Introduction (p. 37) as due to the absence of a sheltering barrier of mountains on the north.

As regards the constituents of the flora of this region, it is worthy of note that the close correspondence between the vegetation of the Roumelian mountains with that of Mount Olympus on the Asiatic side of the Sea of Marmora is one of the best proofs of the recent date of the connection between the Black Sea and the Ægean, and this accounts likewise for the affinities between the more distant floras of the Caucasus mountains and those of the Balkan peninsula. Among the endemic species of this region there are two genera, *Ramondia* and *Haberlea*, of peculiar interest, inasmuch as these genera are the only representatives in Europe of an entire natural order (the *Gesneraceæ*), the nearest allies of which, moreover, are met with in India,[1] though the first of the two has another species in the Pyrenees.

The magnificent forests of the Balkans still harbour wolves and bears; but the fauna offers little else worthy of remark, unless it be the presence of the camel in Constantinople, warning us of the neighbourhood of the Asiatic continent, as the monkeys on the rock of Gibraltar remind us of the opposite coast of Africa.

6. *Crete or Candia.*

Like Northern Hellas and the Morea, all the islands of Greece are mountainous. The highest and most imposing group is found in *Crete* or *Candia*,[2] the largest of

[1] Engler, *Versuch einer Entwickelungsgeschichte*, etc., i. 63.

[2] The name *Candia*, frequently applied to the entire island, is the Italian form of *Khandax*, the Saracenic name of *Megalo-Kastron*, one of the chief cities of Crete.

these islands, and belonging politically to Turkey, though connected with Greece by its physical and ethnological characters. It lies quite outside of the Ægean archipelago, and, along with the islands of Servi, Cerigo, Cerigotto, Caxo, Scarpanto, and Rhodes, forms a kind of semicircle leading on from the southern end of the Morea to the south-western coast of Asia Minor. Like much of the Morea, its geological formations consist of gneissic rocks, and of Cretaceous and Miocene strata. These, and indeed all the islands of the archipelago (excepting some of comparatively recent volcanic origin), may be looked upon as relics of that old land which sank in post-Miocene times to form the Mediterranean Sea, as explained on pp. 11-12.

The island of Crete is about 160 miles in length. From west to east, about one-third of the island is from 2000 to 5000 feet high, and above that height among other altitudes rise—*Aspra-buna*, or *Leuca-Ori* (8081 feet high), *Psiloriti*, the ancient *Ida* (8059 feet), and *Lasiki* (7100 feet). On the coast south of the river Hieropotamo are the Messara Hills. The cave of Melidóni, on the western slope of Mount Ida, is remarkable for the beauty of the stalactites which bedeck its walls. It was here that in 1822 about 300 Christians — mostly women, children, and aged men—who had taken shelter in the cavern, were suffocated by the Turks, who burnt a quantity of straw, sulphur, and other combustible matter at its entrance.

The soil of Crete is exceedingly fertile, and the climate in most parts excellent. Its principal products are the olive, the vine, the orange, and the carob-tree or locust-bean. Valonia, a substance used in dyeing, is obtained from oaks growing near Retimo. The best wine is still made from grapes in the district of *Malevesi*, near

Candia,—a district which gave its name to the famous *Malvoisie* or *Malmsey*. One of the most important productions of Crete is the soap made from olive oil. Among the animals of the island may be mentioned the Cretan ibex (*Caprea picta*), which is found only here.

7. *The Ionian Isles.*

Off the western coast of Greece lies the group of the Ionian Isles, at one time under the protection of Great Britain. On *Cephalonia*, or *Kephallenia*, one of the two largest of the group, *Monte Nero*, or *Elato*[1]—the ancient *Ænus*—rises to an elevation of 5310 feet, and is thus the culminating point not only of this island but of the whole group of the archipelago. It is notable that near Argostoli, in Cephalonia, streams of sea-water pour steadily into the land through fissures in limestone in sufficient volume to be used for the driving of mills. Five and a half millions of cubic feet of water are estimated to be poured into the interior of the earth per day. *Corfu*, known anciently as *Corcyra*, is a fertile island of about the same size as Cephalonia. *Zante*, or *Zakynthus*, possesses bituminous springs; and in this island factories have been established for obtaining pyrene oil from the refuse of the olive-oil mills. The other principal islands are *Santa Maura*, or *Leucadia*, so called from its white cliffs, the famous island of *Ithaca* or *Theaki*, *Cerigo*, *Paxos*, and *Antipaxos*.

The Ionian Isles are remarkable for their beauty and fertility, but are subject to frequent earthquakes.

[1] *Monte Nero* = Black Mountain; *Elato Vuno* = Pine Mountain. Both names refer to the pine-forests with which the mountain was formerly clad.

8. *Eubœa.*

The large island of Eubœa, in the Ægean Sea, lies so close to the shores of Bœotia and Attica that it forms almost a part of the Grecian mainland. It trends in a north-west and south-east direction, and is traversed throughout its length by a range of limestone hills culminating in *Mount Delphi*, the ancient *Dirphe*, which reaches an altitude of 7266 feet. From the mainland the island is separated by a long narrow and shallow strait, the northern part of which is known as the Channel of Talanti, while the southern portion is distinguished as the Channel of Egripo. Towards the middle this strait is so contracted that it has from ancient times been spanned by a bridge, which places *Chalcis*, the capital of Eubœa, in immediate communication with the mainland. This strait, remarkable for its rapidly-changing currents, was formerly known as the *Euripus*, whence the town of Chalcis came to be called *Evripo*—a word which was corrupted successively into *Negripo* and *Negroponte*. The entire island is still sometimes known under the name of Negroponte. It reaches nearly 100 miles in length, but its breadth even in the widest part is not more than 20 miles. The southern end of Eubœa is separated by the Channel of Doro from the isle of Andros, the most northerly of the group of Cyclades.

9. *The Cyclades and the Sporades.*

The Ægean Sea is thickly studded with islands, which are generally arranged in two groups—the *Cyclades* belonging mostly to Greece, and the *Sporades* to Turkey. Of the Cyclades, the largest is *Naxos* or *Naxia*. In this

island Mount Oxia, or Drios, rises to a height of 3290 feet, and thus forms the culminating point of the group. Naxos is rich in marble, but its chief wealth lies in its *emery*, of which 2000 tons are annually raised. This emery is an impure kind of corundum, or native alumina, of very limited occurrence, and largely used as a polishing agent. *Syros*, or *Syra*, is the most important of the Greek islands, and has become of late years the chief centre of commerce in the Levant. Its capital, *Hermopolis*, is a modern town, built near the harbour, and the seat of great trade. *Paros* yields the fine statuary marble which was known to the ancient Greeks under the name of *lychnites*, in allusion to the underground quarries being worked by aid of lamps (Greek, *lychnoi*). The Parian marble occurs chiefly on Mount Marpessa. *Antiparos* is famous for its stalactitic caverns; while *Melos* or *Milo* yields alum, sulphur, and other volcanic products.

But the most interesting centre of volcanic action in the Ægean Sea is unquestionably found in the island of *Santorin* or *Thera*. This is an island of horse-shoe shape, about thirty-six miles in circumference, consisting of marble and schistose rocks overlaid by thick masses of scoriæ, lava, and volcanic tuffs with marine shells. Opposite to Thera is the smaller island of *Therasia*, and the two appear to represent parts of the rim of an old crater, which descends beneath the sea to a depth of 1278 feet. According to Fouqué this volcano must at one time have formed a large island well wooded and locally inhabited, the centre of which was blown out in prehistoric times by an explosion of tremendous force.[1] Between Thera and Therasia rise three volcanic islets—*Palaia Kaïmene* or *Hiera*, which was thrown up by an eruption in the year 197 B.C.; *Nea Kaïmene*, the largest of the group,

[1] *Santorin et ses Eruptions*, by M. Fouqué. Paris, 1880.

which first appeared above the waters in 1707 A.D.; and *Mikra Kaümene*, which was elevated in the sixteenth century. In the early part of 1866 eruptions were commenced afresh in Nea Kaümene, and the activity continued until 1870.

Of the islands belonging to Turkey, the most northerly is *Thasos*, the highest point of which is the pine-clad mountain of Ipsario, which rises to a height of 3428 feet. But in the neighbouring island of *Samothrace* Mount Phengari reaches an elevation of not less than 5240 feet. The chain of the Sporades is continued by the islands of *Imbros*, *Lemnos* or *Limni*, *Tenedos*, and *Lesbos*, or *Mytilene*. A reddish clay, reputed from remote antiquity to possess great medicinal virtue, is dug in the isle of *Lemnos*, and is still exported in the shape of small balls bearing a stamp, whence it has been known as *terra sigillata*. From Lemnos we pass to *Chios* or *Scio*, an island of nearly 400 square miles, which suffered from a terrible earthquake in 1881. Among the products of Scio may be mentioned "gum mastic," which is an exudation from the *Pistacia lentiscus*. The isle of *Samos*, famous as the birthplace of Pythagoras, gave its name to the ancient red glazed pottery known as "Samian ware." *Patmos*, or *Patino*, was the scene of St. John's exile and of the vision of the Apocalypse; while *Kos*, or *Stanco*, is famous as the birthplace of Hippocrates and Apelles. Of all the Sporades, however, the most renowned is the island of *Rhodes*, situated at a distance of about 12 miles from the coast of Caria. Here Mount Attairos, or Atabyros, reaches an elevation of 4068 feet above the sea level. It is unnecessary, however, to refer to these islands in detail, as all those which fringe the Anatolian peninsula belong physically to Asia rather than to Europe.

10. *Cyprus.*

Situated in the far east of the Mediterranean, opposite the shores of Syria and Anatolia, the great island of *Cyprus*—known to the Turks as *Kubris*—is clearly related to the continent of Asia rather than to that of Europe. It has therefore been noticed in the volume on ASIA in this series; but as that notice was necessarily very slender it seems desirable to supplement it by farther information, which can be appropriately introduced in this place.

Cyprus has an area of 3723 square miles: its greatest length is 140 miles, and the maximum breadth 60 miles, while the circumference of the island is about 400 miles. It is traversed by two chains of mountains partly covered with forests, running roughly parallel to each other, and enclosing between them a wide irregular plain, studded with flat-topped hills and conical mounds. The northern range runs near to the coast, from Cape Kormakiti to Cape St. Andreas, the extreme north-west point of the island. It presents steep faces, especially towards the south, while its crest is serrated or broken into turreted peaks, which rise to elevations of more than 3000 feet. The southern range, known as the *Troödos Mountains* or *Olympus*, is characterised by rounded outlines rather than by craggy peaks. It culminates in Mount Troödos, which, rising to a height of 6340 feet, forms the most elevated point in the island. The trees and shrubs are chiefly conifers (the maritime and the Aleppo pine on the lower levels, the Karamanian black pine higher up, the juniper, etc.), besides the mastic shrub, a species of strawberry tree and a species of oak.

The southern chain of hills consists mainly of serpentines, with trachytic rocks, and other forms of lava; and these also appear in the northern hills, which, however,

are mainly formed of calcareous rocks. The oldest stratified rocks in Cyprus are certain unfossiliferous limestones, perhaps of Jurassic age, known as the "Mount Hilarion limestones." These are followed by the "Konos"—a local name applied to certain calcareous rocks, also destitute of fossils, but probably referable to the Cretaceous system. The Miocene limestones, with gypsum, which have been termed the "Idalian beds," occupy a large area, and pass locally into a series of strata of undoubted Pliocene age, to which Mr. R. Russell has given the name of "Nicosia beds." A yellow calcareous sandstone, known as the "Kerynia rock," furnishes the chief building-stone of the island.

Most of the streams in Cyprus are insignificant, the only important river being the *Pedias*, which rises on the slopes of Mount Makbera, one of the southern range of hills, and flows past Nikosia to the marshes near Famagusta. The Lake of Paralimini, not far from Famagusta, is a sheet of fresh water having a circumference of between 4 and 5 miles. Near Larnaca is a great salt lake, and another occurs in the neighbourhood of Limassol. During summer these lakes yield by evaporation a large quantity of salt, which was formerly a source of considerable revenue.

The copper mines of Cyprus were of great importance in classical times, but no large deposits of ore are now known. The wealth of the island lies rather in its vegetable products. The vine, the olive, the carob-tree, the cotton-plant, tobacco, and cereals, are cultivated with success. Two kinds of wine, known as *maoro* and *comandaria*, are made in the island. Silkworms are reared, and a coarse kind of silk is woven.

The principal towns of Cyprus are *Nikosia*, or *Lefkosia*, the capital, which is the only considerable inland town; *Limassol*, on the south coast, a military station not far from Mount Troödos; *Larnaca*, a port on the south-east;

and *Famagusta* on the east coast. Antiquities of extraordinary interest, testifying to the former prosperity of the island, were exhumed in great abundance by General di Cesnola when residing in the island as American Consul.[1]

[1] For a general description of Cyprus see Lieut.-Col. Playfair's *Handbook to the Mediterranean* (Murray), 2d ed., 1882; for the geology, consult Mr. R. Russell's paper in the *Report of the York Meeting of the Brit. Assoc.*, p. 640, 1882; for the archæology, Gen. di Cesnola's *Cyprus;* and as to the forests see a communication to *Ausland* by the superintendent of the works of re-afforestation (p. 744, 1883).

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PART II.

THE EUROPEAN STATES AND PEOPLES.

CHAPTER I.

FRANCE.

1. *Characteristics of the People—Ethnography.*

In the natural wealth of her soil, in the high degree of prosperity pervading all classes of the community far more uniformly than elsewhere, and in the mental elasticity of her inhabitants, France undoubtedly takes the foremost rank amongst European states. Taking *French* as synonymous with the Latin or rather Latinised race now inhabiting France, we may describe this people as being on the whole endowed with a sanguine temperament. But in saying this we are anxious to avoid the inference so often made on the strength of a crude notion of what the sanguine temperament implies,—that the French are superficial, frivolous, immoral, puerile, or inconstant. Whoever will take the trouble to follow the intellectual movement in France, from the lowest to the highest grades of society, and probe the serious side of its national literature, in order to appreciate the high moral and earnest tone animating its social and literary life, will be apt to smile at all the nonsense flippantly

uttered on the subject of French levity and want of solidity.

But in order to form a proper estimate of the national character, which in France as elsewhere is an all-important factor in appreciating its historic development, we must make a closer study of the individual elements out of which the present French nationality has been moulded. It should accordingly be borne in mind that Gaulish, often called Keltic, races were in possession of the country when Cæsar's legions first began to Latinise them. In some places, especially the north-west provinces, this Keltic element has been preserved to the present day. Nor can the Teutonic mixture be overlooked, particularly in the eastern districts. Proudhon does not hesitate to say that "modern France consists of at least twenty different nations, whose characteristics, especially amongst the peasantry, are still clearly marked." This writer no doubt goes too far, inasmuch as the mere names of the several territorial divisions in many cases imply no deep ethnical distinction between the inhabitants, or at least not deep enough to have produced any material influence on the general national development. At the same time, whether the result is to be attributed to descent, climate, or other influences, there exists a greater difference between the Fleming from the neighbourhood of Dunkirk and the Provençal on the Mediterranean seaboard, or the Béarnais at the foot of the Pyrenees, than between the Pomeranian and the Bavarian or Austrian.

The characteristic qualities of the natives of the several provinces are so constant and uniform that they have become proverbial. Thus, the Flemings are, or are supposed to be, slow and phlegmatic, yet industrious and prosperous. The Picard is honourable and outspoken,—"frank Picard,"—but somewhat blunt. The Norman is industrious, but litigious; if he can help it he will never

give you a decided answer. The Breton is honest, trustworthy, but obstinate. The Auvergnats are thrifty, perhaps too much so, and very clannish. The natives of Poitou are credited with subtilty, and those of Berri with bashfulness. The Provençals are said to be lively, quick to take offence, but also quick to forgive, The Gascon is witty, but also an unconscionable boaster, whence the expression *gasconading*.

The ethnography of France is still involved in much obscurity. According to the results of modern research, however, there exist here two races, side by side, one stretching northwards from the Seine, the other dwelling south of the Loire, the intermediate territory being occupied by a mixed people. The southern race is of comparatively low stature, with dark eyes and hair, and round head. It is diffused over three-fifths of the total area, and numbers about 19,000,000 altogether. The northern race, characterised by a tall stature, light eyes, fair hair, and oval head, numbers no more than 9,000,000, spread over about one-fifth of the land.

The latter, as shown by Baron Roget de Belloguet,[1] are the descendants of the old Gauls, who were endowed with the high qualities of the tall fair race; speaking one common language, adhering to one common form of worship, and possessing one common political and religious ideal, which they brought with them into Gaul. But these Kelts here found another and older race already settled in the country, the non-Aryan Ligurians, who, according to some ethnologists, are still represented in the great bulk of the French population.[2]

[1] *Ethnogénie gauloise;* Paris, 1858-1873.

[2] On French ethnology see the writings of the late Dr. Paul Broca, especially his "Recherches sur l'Ethnologie de la France," *Mémoires de la Société d'Anthropologie*, tome i. p. 1. See also Professor Keane's Appendix, "On the Ethnology of the European Races."

2. Manufactures, Commerce, and Communications.

As a manufacturing country France has always held a high place. The chief centres of industry are Lyons in the south; and in the north, French Flanders and Normandy. French goods are characterised, in general, by cheapness, elegance both of form and colour, refined taste, and great durability.

The most important branches of industry are:—Cotton, surpassed by that of England alone, principally in Normandy (Rouen), Picardy, and the Vosges; linen, chiefly in Flanders, Normandy, Picardy, and Brittany; woollen stuffs, also mainly in the north; silk, elsewhere unsurpassed, in Lyons, Paris, Nîmes, Valence, and St. Etienne; lace, including the famous Valenciennes, Alençon, Bayeux, and Caen varieties; leather, especially patent-leather goods and gloves. For gloves, both dog and rat skin are also employed, the latter being in great demand on account of its softness and delicacy. The Paris saddlery and harness ware are much esteemed, as are also the paper goods, including the universally celebrated French playing cards. Excellent terra-cotta, faïence, and porcelain ware are produced in Sèvres, Limoges, and Rouen, while the glass-works have attained to the highest development.

France also produces furniture, soap, perfumery, clocks, gold, silver, and bronze wares, the so-called *articles de Paris* (Paris fancy goods), besides iron, steel, copper, brass, tin, wooden wares, and chemicals in large quantities. Important also is the beet-sugar industry, and of late years the beer trade, together with the excellent French liqueurs and brandies. In the preparation of essences France surpasses all other countries.

Its foreign commerce, no less than its industries, is

highly developed, yielding in importance to that of Great Britain alone.

Means of communication are widely diffused over the country. It possesses more especially the completest system of canals and canalised rivers in any European state, including some engineering works of the first order. Projects are at present being discussed for rendering some river-beds more navigable, in order to facilitate to the utmost the carriage of heavy goods. Foremost amongst these projects is one to construct a good water highway between the English Channel and the Mediterranean Sea.[1]

3. *Political and Social Traits.*

Passing from the economical to the social condition of the country, it may be remarked that on this subject the most erroneous ideas are still current abroad. What strikes the dispassionate observer of French history and society more than aught else is the great number of seeming contradictions he meets with at every turn. Passionate participation in political matters succeeded by stolid indifference, enthusiasm and scepticism, routine and a spirit of innovation, sublime abnegation and selfish withdrawal from public affairs, a yearning for freedom while submitting to absolutism, rapidly succeed each other almost without respite on the political arena. Superstition and unbelief, depravity and a sense of the sanctity of the family life, rhetoric and the most jejune taste, trespass hard one on the other, or rather meet face to face, go hand in hand in the religious, social, and intellectual world. Still more striking is the contrast between the private and public character of the French-

[1] For a recent account of the French canals and canalised rivers, see a paper entitled "Die Wasserstrassen Frankreichs," by H. Keller, in Petermann's *Mittheilungen*, 1881, p. 401.

man. Frivolous, extravagant, yielding only to his impulses in all that concerns the State, the same individual is provident, thrifty, always a shrewd man of business, in everything connected with his personal relations. There is one explanation of these apparent inconsistencies. Unless we mistake, the secret lies in the direct antagonism of their natural temperament and their mental tendencies. Rationalism, a logical turn of mind, lies at the bottom of French intellect. This fundamental trait, which did not find its fullest development and most definite expression till the eighteenth century, acquired absolute ascendency in the Revolution and under the Empire, while not till our days has it clearly manifested its various influences, wholesome and poisonous, on public and private life.

4. *Public Instruction.*

Passing to a consideration of the intellectual condition of a society so constituted, the state of public instruction must claim our first attention. Till 1882 the education of the people was neither compulsory nor gratuitous. The consequence was that, before the passing of the Act rendering attendance on school compulsory on all children from the end of the sixth to the end of the thirteenth year, it was estimated that about 15 per cent of the children attended no school. The eastern provinces are the best, the western the least, educated.

Recent laws have likewise deprived the clergy of much of the control which they formerly exercised over education, while at the same time doing much to promote higher education, as well as that of an elementary kind. There are in France no universities like those of other European states. The University of France is chiefly an administrative board, having under its direc-

tion a number of colleges in different parts of the country bearing the title of *académies universitaires*. Notwithstanding all the shortcomings of public instruction in France, it should be stated that here flourish institutions and learned societies for every branch of human knowledge, and that steps have been taken to provide gratuitous instruction in Paris in all imaginable subjects by the most celebrated scientific lecturers of the day, so that in scarcely any other place can self-instruction be so conveniently carried on as in this capital.

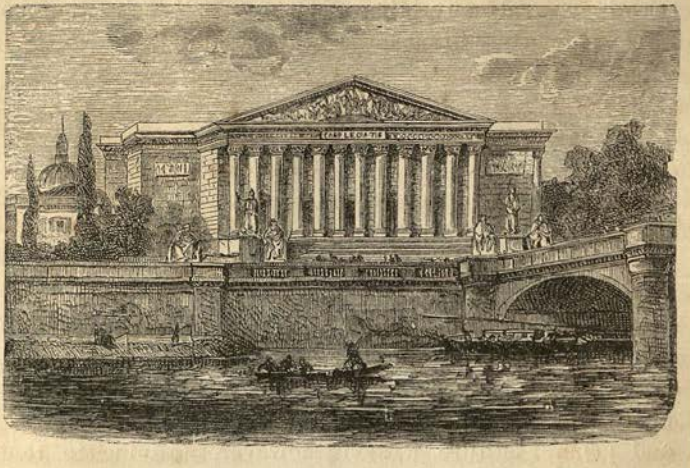
5. *Chief Towns—Paris.*

"Who says Paris says France" is constantly in the mouth not only of the leading French writers, but also of most foreigners. Yet the saying is very misleading, for the life of the provinces is entirely different from that of Paris, and even far from uniform in the provinces themselves. These provinces have numerous cities, each with a peculiar stamp of its own, and some—such as Lyons, Marseilles, Bordeaux, Nantes—have become almost rivals of the capital in size, population, mercantile importance, and general culture, without, however, attaining to that peculiar charm which has rendered Paris unique in the world, a veritable *urbs* in the sense of the old Romans. Hence, while a detailed description of other French towns may be dispensed with, it is impossible to speak of France without devoting a few words to its capital, which, next to London, is the largest city in Europe.

"There it lies, the large and splendid city, with its two millions[1] of inhabitants, in the broad basin traversed by the Seine, encircled by heights, from the summit of which one looks down upon a sea of houses, overlooked in the west by the lofty dome surmounting the

[1] At the census of 18th December 1881, 2,226,000.

fine large Hôtel des Invalides, in the middle by the two high towers of the principal church, the cathedral of Notre Dame, and at all ends and corners by the turrets, pinnacles, and gables of beautiful buildings. We will make our entrance in thought from the west, where the Seine, after traversing the town, describes a large semi-circle on the north. There, between the river and the



PALACE OF THE CORPS LEGISLATIF, PARIS.

town, lies the charming Bois de Boulogne, the resort in fine weather of all the wealth and elegance of the Parisian world. Having lingered a while amidst the splendour and gaiety of that attractive scene, we pursue our way eastwards. There we have before us a magnificent broad straight street, the end of which is too remote to be seen. It leads us through a splendid triumphal arch, the Arc de l'Étoile, built by the first Napoleon. Still following this route we next pass through the Champs Élysées, a beautiful park, swarming with people, bounded on one

side by the Seine, which flows along on our right. Farther on we come to the garden of the Tuileries, and then we have in front of us the extensive palace of the same name, which formed the residence of the last sovereigns of France. It stretches with its wings for a great distance along the Seine, and then unites with the Louvre, an older royal palace, the saloons of which now contain the celebrated collections of paintings, statues, and other splendid works of art. Not far from this, nearer the heart of the town, is the Palais Royal, which has long ceased to be a royal palace, but now, with its innumerable fine saloons, shops, and restaurants, is the place where thousands of residents and strangers buy the costliest that can be bought, enjoy the most exquisite delights, and spend their money on all imaginable pleasures. . . .

"Still proceeding eastwards we pass along the banks of the Seine with rows of the finest houses on our left, and then we turn to the right across one of the many handsome bridges, and now find ourselves on the Ile de la Seine, where, nearly 2000 years ago, in the time of the Romans, the nucleus of the town, *Lutetia Parisiorum*, arose. Here is the church of Notre Dame with its two beautiful but unfinished towers. We continue our way to the opposite bank of the river, where the smaller half of the city extends. On this side we find the splendid building where the deputies of the people used to assemble, that in which the Invalides (the wounded veterans of the French army) are so nobly housed, and the enormous parade-ground called the Champ de Mars. If, however, we return from Notre Dame to the north side of the river we may visit the municipal building, the Hôtel de Ville, where so many revolutions, and among others the last, have had their birth; then the Place de la Bastille, where the old royal dungeon once stood; and

the Place Vendôme, in which stands the bronze column surmounted by the bronze statue of the first Napoleon. A staircase leads up the interior of this column, from the top of which one has a bird's-eye view of the splendid town. Around the column the victories of the great conqueror are represented in half-relief. All these wanderings have led us also across the boulevards, beautiful wide avenues, with handsome houses on both sides, partly occupying the sites of old ramparts, partly new, laid out by the last Napoleon, and intersecting the city in all directions. If such is the beauty within the town, especially since it was cleansed by the last Napoleon of a large number of narrow dirty lanes, in place of which broad, straight, airy streets have been constructed, on the outside of the town there are not wanting signs of the military character of the place. The whole town is surrounded by a wall and moat, and is accordingly a gigantic fortress. . . . Round it lie a number of independent forts, of which Mont Valérien is the most important and the highest. . . . Then if we have a mind we can also make a subterranean ramble under the streets among the catacombs, that is, the old quarries from which building materials have been derived for more than a millennium, and which at the same time contain in orderly arrangement the millions of bones of previous generations, which have been piled up there layer above layer since the abolition of the burial-places within the town. Among the cemeteries of the present day we may visit the beautiful Père Lachaise, where many celebrated men now rest; and among other pleasant resorts we may wander through the large and beautiful botanic garden, Jardin des Plantes, which also contains a zoological collection and several museums. Outside the walls we may visit on the north St. Denis, formerly the burial-place of the French kings; on the west the palace and garden of St. Cloud, the

favourite residence of the Napoleons; on the south the splendid palace of Versailles, with its equally splendid garden and celebrated fountains, and lastly, still farther south, the palace of Fontainebleau in a charming wood. That is Paris, the capital of France even in this sense, that the whole of France has accustomed itself for two centuries to be governed from that centre, and to follow every movement that originated there, whether it leads to revolution, to monarchy, to imperialism, or to republicanism."[1]

Of the other large towns of France, those most worthy of mention are Lyons (373,000), at the confluence of the Rhone and Saône, the second city in point of size, and the great seat of the silk manufactures, which were introduced here by Italians in the fifteenth century; Marseilles (358,000), the ancient *Massilia*, the principal seaport in France and the fourth in Europe, and probably the oldest town in the country, having been founded by a colony of Phocæans in the sixth century B.C.; Bordeaux (221,000), formerly the capital of Guienne (Aquitania), now a great wine-exporting seaport; Toulouse (137,000), once the capital of the Visigothic kingdom in the south-west of Gaul, and afterwards of an important French fief. An attractive feature of the country round Marseilles is presented by the large number of small country houses with which it is studded, houses belonging not to the wealthy but to the middle and lower classes, who resort thither to spend their Sundays in rural enjoyment.

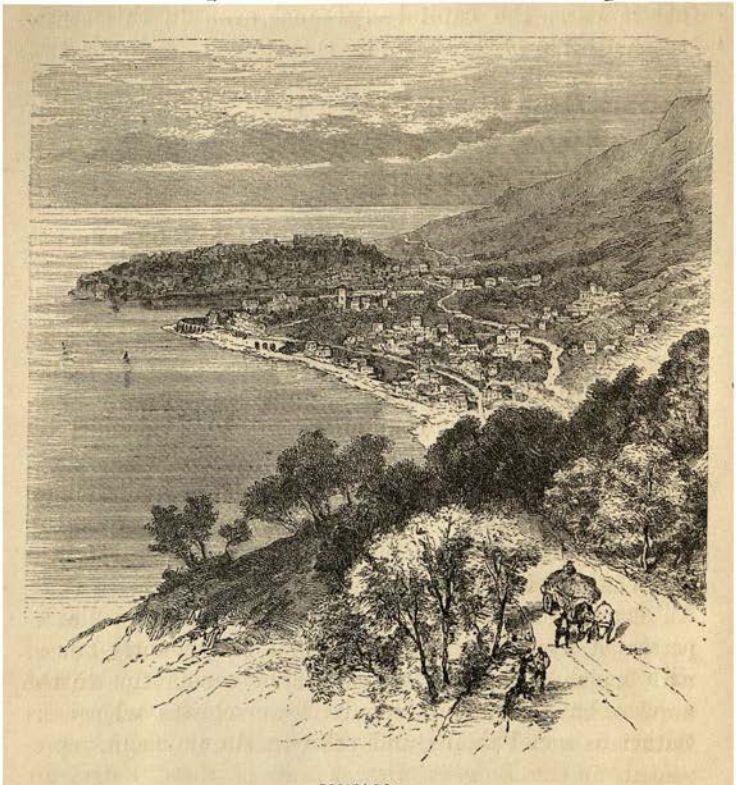
6. *Andorra, Monaco.*

In the Pyrenees the valley of Andorra, on the Spanish side of the mountains, forms an independent

[1] Fr. Hobirk, *Wanderungen auf dem Gebiete der Länder- und Völkerkunde*, vol. vi. pp. 1-4.

republic under the protection of France and the Bishop of Urgel in Spain.

The sovereign principality of Monaco, in the department of the Alpes Maritimes, is also under the protector-



MONACO.

ate of France. Its territory embraces little more than eight square miles, and contains a population of about 7000. It consists of the old town of Monaco, with its castle; Monte Carlo, with its well-known casino; and Condamine, lying between Monaco and Monte Carlo.

CHAPTER II.

THE KINGDOM OF BELGIUM.

1. *People—Walloons and Flemings.*

THE kingdom of Belgium has been artificially welded together out of two essentially distinct ethnical elements. There is no such thing as a Belgian race, but only a Belgian nation, and this nation is composed of two stocks—the Romance or Latin Walloons, partly speaking French, and the Teutonic Flemings, mostly speaking Netherlandish. French, however, is the official language of the country and of the Government.

Of all the European states, Belgium has the largest relative population.[1] The population is denser in the region where Flemish is spoken than in that in which the Walloon element predominates.

The present population of Belgium is partly of Keltic, partly of Teutonic origin. Within the historic period two languages and two races have constantly existed north of the Ardennes—the Teutonic represented by the Batavians and Frisians, and the Gaulish or Keltic represented by the Belgæ. Descendants of these Belgæ are the Walloons, who long retained their primitive speech, on which the later neo-Latin had almost less influence than the Teutonic. Hence Walloon is by no means a corrupt French, although, since the political supremacy of the Burgundians, to a large extent displaced by that

[1] See Table I. in Statistical Appendix.

language. Still less is it a corrupt German, but shows greater affinity rather with the Romance of several Swiss cantons, and with the Tyrolese Ladin or Rumonsh. In some rural districts of Belgium the two elements are so blended together that a Walloon often adjoins a Flemish village, or else both are separated only by the intervening highway. For hundreds of years the two races have thus dwelt together, for hundreds of years they have lived through the same political vicissitudes, but to the present time no intimate union has taken place between them. This deep contrast between speech and national usages has outlived the Revolution of 1830, notwithstanding all their common institutions and interests, and the belief is very general that these interests and their common freedom are the only ties that hold them together. A line drawn from Dunkirk, south of Tournai, to Ath, and thence north to Tongern, will roughly divide the Belgian territory according to the two forms of speech prevailing in it, though, as is evident from what has been stated, there are isolated Walloon groups north of this line, as there are Flemish to the south-east of it. In Brussels both idioms meet on common ground, the upper town being decidedly French, the lower Flemish.

In order to form a correct estimate of the political and social situation in Belgium, it is necessary constantly to bear in mind the ethnical identity of the Flemings with the Dutch. At the Congress of Vienna the seeds of dissension were sown by comprising within the then constituted kingdom of the Netherlands the Walloon domain, instead of transferring it to France, to which it naturally belonged. The differences of habits, customs, and especially of religion, contained the germs of endless future discord. As almost everywhere else, here also the south was Catholic, the north Protestant. To the former confession adhere both the Teutonic Flemings and the Keltic

Walloons, and the kingdom of Belgium, as now constituted, is one of the most Catholic countries in the world. Hence the antagonism between north and south betrayed itself with the greatest bitterness, first of all in the Church, and then in the army and the States-General, resulting at last in the violent severance of Belgium from the Protestant Netherlands in 1830. But scarcely had the new kingdom been established when the national antipathies were again manifested. The Catholic clergy had no doubt skilfully availed themselves of the Walloons and French, out of whose ranks the most enlightened and energetic spirits had arisen. But once their independence was achieved they took a decided part with the Flemings, who now formed the majority, and who demanded that the new nationality should be based on their speech. In truth, but for the efforts of the lower clergy in previous times, Flemish would have long since sunk to the position of a mere patois. However, notwithstanding the attention they have since paid to their national literature, the Flemings have been hitherto unable either to set aside the French language in Belgium, which continues to be the idiom of all the upper classes, or yet to acquire the political position due to their numerical ascendancy. The cause of this failure lies doubtless in the intellectual superiority of the Walloons. The two conflicting elements have thus clashed more violently than ever, mainly on ethnical grounds. The Flemings, the majority of whom were mere tools in the hands of the clergy, have long begun to regret their wilful divorce from their Dutch kinsmen, and the "Flemish movement," as it is called, has been for years endeavouring to efface all traces of dialectic differences between the northern and southern branches of the Netherlandish tongue. The philological congress, which assembles annually in one or other of the Dutch and Belgian cities, has also succeeded

in bringing about orthographic uniformity in both idioms. But the more pronounced become the efforts of the Flemings again to be united with their northern kindred, the less disposed do the Dutch show themselves to sympathise with such advances.

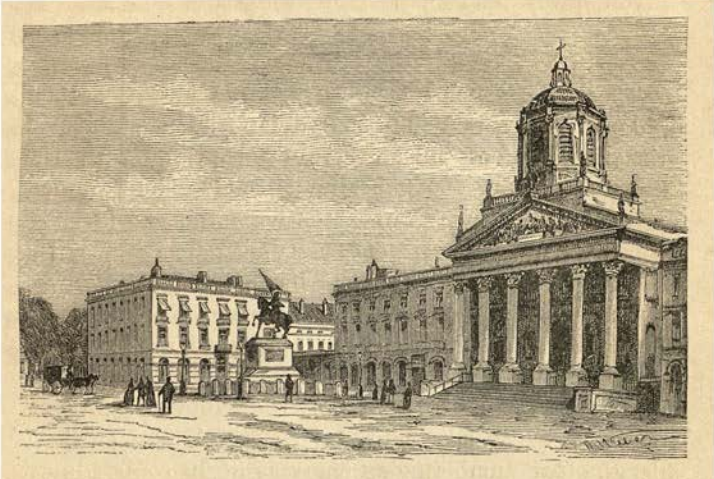
Whoever has resided for any length of time in Belgium and in the neighbouring Holland, is at every moment involuntarily tempted to draw comparisons between the two States. A short visit to the cities of Rotterdam and Antwerp brings the points of difference into a strong light. The Dutch love of cleanliness is at once missed in the Belgian seaport, and the high but narrow houses of the Dutch are here replaced by older and often more pretentious structures. Both places are about the same size, Antwerp now containing a population of 175,000. But as a seaport Antwerp has latterly far outstripped her Dutch rival; and not only her Dutch rival, for the prodigious growth of her shipping within the last few years has placed her in this respect in advance even of Hamburg and Marseilles.

2. *Chief Towns.*

Not far from the centre of the Belgian territory stands Brussels, the brilliant capital of the kingdom. Including the adjoining eight communes, Brussels has a population of 360,000, and consists of an Upper and a Lower Town. The latter, being the oldest Germanic portion of "Brugsel," that is, "The Bridge," contains the most important buildings, such as the Town Hall, the fine cathedral of S. Gudule, and others. Brussels has not unjustly been named "The Little Paris." Like that most magnificent of European capitals, the Belgian city boasts of its boulevards, many sumptuous buildings, and a suburban forest, the Forest of Soigne, which is much grander and more extensive than the Bois de Boulogne.

But here all further comparison ceases, and the beautiful Seine, reflecting most of the grand monuments of Paris, is represented in Brussels by the wretched little Senne, which in the heart of the city is now completely covered in.

Most of the other principal towns of Belgium are at least of great historical interest, and can look back to a time when they played a more important part in European



PLACE ROYALE, BRUSSELS.

history than they do now. Some of these, like Ghent (134,000), during the Middle Ages the most populous city in Europe, now the chief seat of the cotton-spinning industry in Belgium, and Liège (126,000), now the centre of the Belgian iron industry, have experienced a modern revival, while others, such as Louvain (36,000), whose university, founded in 1426, was during the sixteenth century the most celebrated in Europe, and Bruges (45,000) have had no such revival, and the latter, with the remains of its splendid garments too large for its shrunken body, is more fitted than any other town in

Europe to impress the imagination with the witnesses of its ancient glory. Of the other towns of Belgium we may mention Mechlin, or Malines (43,000), seat of the Archbishop and Primate of the kingdom, and centre of the railway system, a town pleasantly situated in the flat but green and extremely fertile low-lying plains of Flanders, not far from Brussels.

3. *Flanders.*

The whole country between Brussels and the coast is like one vast garden, a careful and long-established rational system of tillage here co-operating with the natural fertility of the rich alluvial soil. There are certainly no broad acres and extensive farms, as in most other parts of the Continent, the unusually dense population having caused the land to be cut up into countless little independent holdings; nevertheless it supports an extremely prosperous race of small peasant farmers. Here the numerous villages are also each a seat of such local industries as are needed to supply the wants of the population scattered in large numbers over the land. In these villages, often numbering as many as 8000 souls, almost every handicraft is represented; and yet most of the 2000 Flemish thorpes and townships had formerly a larger population even than at present. The mediæval aspect of the country is here intensified by the rich and picturesque local dress, and especially the long dark-hooded mantles of the women, giving them somewhat the appearance of nuns. A female peasant is seldom met with who, besides this comfortable and comely attire, is not decked with valuable earrings and brooches set with genuine brilliants, old family heirlooms of a rare though somewhat uniform type, implying long generations of uninterrupted prosperity.

CHAPTER III.

THE KINGDOM OF THE NETHERLANDS.

1. *General Aspect of the Country.*

"THERE is a land where the rivers, so to say, flow over the heads of the people; where mighty towns rise below the level of the sea, which dominates and almost overwhelms them; where broad tracts of cultivated ground are alternately rescued from and swallowed up by the waters; where the natural course of the streams has heaved up sandbanks connecting old islands with the mainland; where old continental provinces, rent and disruptured, have formed new islands."[1]

This singular European land is the Netherlands, which term is simply the political or official title of the kingdom, also usually known as Holland. Geographically speaking, the Netherlands comprise all the lowlands stretching from the Ardennes to the Zuider Zee. This region forms the great delta of the Rhine, the Maas, and the Scheldt, an alluvial deposit produced by these rivers, and preserved by the conflict between the sweet and salt waters. But the main creator and fashioner of this land is the Rhine, with its various branches. In its mighty seaward course from east to west, this river furrows its delta into two clearly-marked halves, forming a northern and a southern district.

[1] Alphonse Esquiros, *La Néerlande et la vie Hollandaise;* Paris, 1859.

2. *People—Elements of the Population—Position of the Dutch in the Teutonic Family—National Traits.*

The whole of the Netherlands, taking them in their widest geographical sense, are no less ethnically than physically divided into two great sections. The inhabitants of the south fell early under the influence and the sway of the southern and alien powers, while those of the north were from the first a freedom-loving isolated race, devoted mainly to fishing and a seafaring life. Hence it naturally followed that their influence prevailed in the Zeeland or Scheldt group of islands. The Zeelanders, or *Zeews*, as the Hollanders call them, are kinsmen of the Dutch proper, and being like them an island people, took part with them in all their political movements, although the Scheldt archipelago, as physically belonging to the region of the Scheldt, might be, and in fact has been, claimed by the Flemings.

The north is in all respects the more rugged and younger brother of the south, and the national speech and usages, character and customs, gradually assumed distinctive features independent of each other, and ever departing more and more from the common original type. In this way was brought about the great divorce of the Belgo-Batavian family, branching off on the one hand into the Dutch or northern, on the other into the Flemish or southern nationality.

Besides the Flemings, who form 13 per cent of the people in the kingdom of Holland, and reside in the provinces of North Brabant and Limburg, there live a small number of Low Germans, 2 per cent altogether, in Dutch Limburg. But the great majority of the inhabitants of the Netherlands are the Dutch;[1] or, perhaps better, the

[1] In order the better to understand what follows, it will be well to remember that the English term "Dutch" is entirely a misnomer as ordi-

Hollanders properly so called, descendants of the old Teutonic Batavians. Chiefly settled in the provinces of North and South Holland, Zeeland, Utrecht, and Gelderland, they form 71 per cent of the entire population; the remaining 14 per cent consisting of the Frisians, also a Low German race, who now occupy Friesland, Groningen, Drenthe, and Over-Ijssel; but who formerly,—that is, before the irruption of the Zuider Zee—were unquestionably spread over the present province of North Holland also. The resemblance in many respects, even in the dress, between the North Hollanders and the Frisians, may still be easily detected by the observant traveller.

Ethnically speaking, both Hollanders and Flemings form a race presenting in its peculiar customs and social features a profound contrast to its German neighbours. Until quite recently efforts continued to be made absolutely to ignore the distinctive nationality of the Netherlanders, and to regard them as differing only in their peculiar dialect from the rest of the Germans. But the utter fallacy of this view becomes apparent when we begin to form some clear conception of the affinities of the Teutonic races. From the now lost prehistoric Teuton

narily used. Etymologically it is simply the German word "Deutsch"; that is, "Teutsch"; that is, "Teuton"; and is therefore the most generic name for the whole Teutonic or Germanic family, thus properly including not only the High and Low Germans, and the Scandinavians, but the English people themselves, so far as they are ethnically descended from the Angles and Saxons of Low Germany. But, according to English usage, *Dutch* has now come to mean nothing more than a very small section of Low Germans dwelling in the Rhine delta. In this sense it has of course no equivalent in Germany, and still less in the Netherlands, where the people call themselves simply "Netherlanders," or else "Hollanders," though this last term is more properly applicable only to the natives of two provinces—North and South Holland. It remains to be stated, that the Germans themselves never extend the word *Deutsch* to the Netherlanders, now restricting its use to all the High Germans and to all the Low Germans excepting the Netherlanders, Flemings, and English.—*Trans.*

speech there sprang the three branches, usually known as the Gothic, Scandinavian, and Germanic, with the last of which alone we are here concerned. This Germanic stock again branched off into the Old High German and the Old Low German, the first giving birth to three dialects—the Frankish, Bavarian, and Alemannic; the last-named being identical with the Middle High German, which, later on, merged in the present current New High German, the ordinary German of literature.

The long extinct Old Low German gave rise to two distinct and well-known offshoots, the Old or Continental Saxon and the Frisian, which last still survives in various dialectic forms in west and north Friesland, on Heligoland and Wangeroog and in Saterland. From the Old Saxon again there sprang the Anglo-Saxon, the Old Netherlandish, and the Old Platt Deutsch or Lowland German, of which the last two have left scarcely any, if any, written records behind them. But all three became in course of time subject to certain modifying influences; so that out of the Anglo-Saxon arose the modern English, out of the Old Netherlandish the Middle Netherlandish, and out of the Middle Lowland German the modern Platt Deutsch. From the Middle Netherlandish, which is rich in literary monuments, is derived the New Netherlandish, usually called Dutch, with which the Flemish is practically identical.

Thus we see that neither Dutch nor Flemish is a dialect or patois, consequently in no sense are they daughters of the German, but are both as far removed from it as is English, each of them having developed from a collateral stock. Nay, more, the Platt Deutsch or Lowland German itself is also quite as remote from New High German as are the English and Dutch. They cannot even be called sister languages, the relations being at the utmost rather those of cousins-german. And this

is quite as applicable to the people themselves as to their speech. The ethnologist, at all events, can have no sort of doubt that the claims of no people to a distinct nationality are more justified than those of the modern Hollanders. With the exception of the strongly-mixed English race, no Teutonic people has such a decided national stamp. In their habits and pursuits they show far greater affinity to the English than to the Germans, and they are themselves fully conscious of this truth. Hence the Dutchman, as a rule, will have nothing to do with the German, and is fully as ready energetically to repel all encroachments on his marshy meadow-lands as in the days of William the Silent; and it may be added that, for this purpose, his grand system of canalisation would be likely to stand him in as good stead as on former occasions.

The national characteristics of the Hollanders are but little known, indeed mostly misapprehended, abroad. They are certainly distinguished by an undeniable reserve and taciturnity towards strangers, herein contrasting forcibly with the amiable communicativeness of the Germans; still the access to the family circle in Holland is not quite so difficult as is usually supposed, and once obtained, all outward appearance of coldness vanishes at once. The reception accorded to strangers, even by the fair sex, is thoroughly warm-hearted and kindly, and this may perhaps be substantially enhanced by the comfortable arrangements in the Dutch homes, of which the mistress of the house is not unreasonably somewhat proud.

Each family usually occupies a house to itself, the dwelling together under one roof with strangers appearing to the Dutchman alike incomprehensible and unbearable. Their houses are fitted up with every comfort and luxury, not only in the large cities, but even in the smaller towns in the east—Zwolle, Leeuwarden, Groningen, etc.—places

seldom visited even by the North and South Hollanders themselves.

This strongly-marked love of home explains many traits in the history of the country, and especially that intense devotion to the cause of freedom in which they have never been approached by their Flemish neighbours. The careful observer cannot fail to notice how everything in Holland is done with a thoroughness scarcely realised elsewhere on the continent. Even were he not hardened by his ceaseless struggles with the watery element, from which he has been fain to rescue the very ground inch by inch, the Dutchman would still be the Englishman of the mainland. In the streets we read the same familiar announcements as in the English seaports—outfittings for the East and West Indies, transatlantic steamship companies, commission agencies for Brazil, booksellers' shops devoted exclusively to works on navigation, colonial affairs, and the like. At a review in the Hague we may see the colonel decorating an officer for distinguished service amongst Dyaks of Borneo, and the strange-sounding names of the Malay Archipelago are in everybody's mouth. In the *salons* we may even hear the soft sounds of the Javanese language on the lips of young ladies and gentlemen, and there are few members of the upper circles in society that have not been at least once to the Indies. The scions of well-to-do merchant houses go to learn business in Batavia or Brazil. After a few years spent in the tropics, these young men, still in their twenty-fourth or twenty-fifth year, return home with matured views and rich experiences of the strange lands visited by them. And even if not belonging to the trading classes, their duties as military men or government officials will often require them to pass some time in the East Indian Archipelago. For next to England the kingdom of the Netherlands possesses the greatest colonial dominions.

3. *Occupations of the People—Religion—Education.*

Three-fourths of the people belong to the Protestant confession, and the remainder chiefly to the Roman Catholic Church. Of Jews there are some 70,000, of whom 30,000 are in Amsterdam alone, so that this element is very largely represented in the Netherlands.

Besides those engaged in trade and commerce, a large number of the daring and hardy seaboard population are occupied with the deep-sea fisheries, while stock-breeding is the principal pursuit of the people in the Eastern provinces.

The intellectual culture of the Dutch stands on a very high level. The greatest attention is paid to public instruction, every village, however small, being provided with an efficient elementary school. Equally well administered are the poor-laws, and public mendicity is a thing unknown in this happy and prosperous little state. Everybody works, and, wherever the circumstances permit, there exists a flourishing industry.

4. *Chief Towns; The Hague, Amsterdam—the Dead Cities of the Zuider Zee—Grand Duchy of Luxemburg.*

The seat of government and residence of the king is the Hague (130,000 inhabitants), one of the handsomest and most elegant cities in Europe. But the true capital of Holland, at least commercially, is Amsterdam (350,000 inhabitants), the great emporium of the German Ocean, whose harbour, the Ij, has now been brought into direct communication with the sea by the recently-completed Ijmuiden Canal. Next in importance is the large naval and commercial port of Rotterdam on the Maas, with a population of 162,000. Besides these three cities there

are a considerable number of towns, varying in size and importance, all crowded together in a narrow compass. Amongst them are Delft, Haarlem, Schiedam, Dordrecht, the two university towns of Leyden and Utrecht, and some others. In the eastern provinces are Zwolle, Leeuwarden, and Groningen, and at the northernmost extremity of North Holland the important naval station of De Helder. Round about the Zuider Zee lie a vast number of places, at one time wealthy and prosperous, but now not inaptly named "the dead cities of the Zuider Zee." But however gloomy the present prospects of such towns as Hindeloopen, Molkwerum, Edam, Hoorn, Enkhuizen, Medemblick, and Stavoren, there is still some reason to believe that a better future awaits them. Nieuwe Diep and Harlingen have already revived, and better days will doubtless be in store for the others, if ever the great project of draining the Zuider Zee is realised.

The Grand Duchy of Luxemburg (998 square miles, and some 200,000 inhabitants) is connected with the Crown only by a personal union, being in all other respects independently administered; the relation between the two States is, in fact, similar to that existing between Sweden and Norway.

CHAPTER IV.

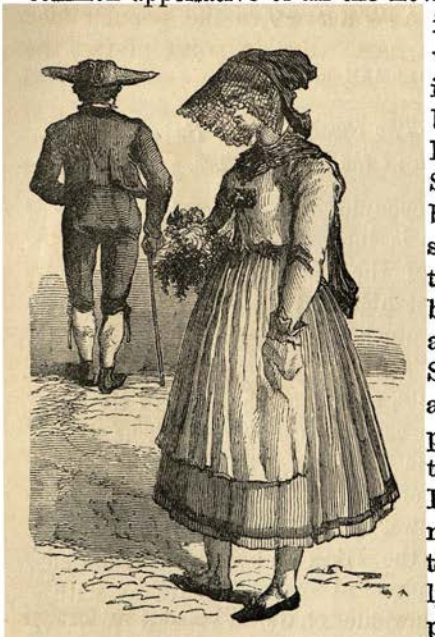
THE GERMAN EMPIRE.

1. *Situation—People—The Swabian and Saxon Races—The Fair and the Dark Types.*

THE German Empire occupies the central portion of Europe, and her domain is intersected by the line dividing the western half of the mainland into two great natural sections—a vast highland region on the south, and a lowland on the north. Corresponding with this physical duality of the Teutonic domain is the ethnical dualism of its inhabitants, so far as they speak the German language, as is the case with eleven-twelfths of the entire population of the empire. The Germans are in fact divided into two branches, differing in their national customs, aspirations, views, speech, and in all probability in descent. These are the High and the Low Germans, and if we compare a physical map of Germany with a philological and ethnographic chart, we shall perceive that the limits of High and Low Germany correspond pretty accurately with those of the highlands and lowlands. The Low German element occupies mainly the North German low-lying plains, as far as an altitude of 650 feet above the sea-level, and is encroached upon only by the Harz, the Teutoburger Wald, and the Sauerland uplands.

Even in early times the Teutons were already divided into two great branches, each of which was in its turn

split up into a number of subdivisions. The truest representatives of the old High German type are perhaps to be sought amongst the Swabian tribes, while the non-Swabian or Low German element might be denoted by the term Saxon. This may be conveniently used as the common appellative of all the Low German peoples, even in a retrospective sense, while also serving to indicate the contrast between their national life and that of the Swabians. These Swabians were originally settled in the east of the present Germany, bordering on the Goths and Slavs, while the Saxons had perhaps already formed temporary settlements in the region of the Lower Elbe, where they ultimately established themselves permanently. At some unknown period the Swabians abandoned the sandy plains of north-east Germany, migrating to the south-western region, which was still occupied by the Kelts, but whither, even in the time of Cæsar, some of those Swabian tribes must have already penetrated. This racial displacement proceeded at a very slow rate, probably occupying the whole period of the Roman sway in the Alpine regions. Nor must it be supposed that the arrival of the Swabian hordes was followed



SWABIAN PEASANTS.

by the utter extirpation, or even expulsion, of the older Keltic element. The two were on the contrary largely fused together, and the results of this fusion may still be detected in the present population of the country. For even amongst the modern Germans there may be distinguished a fair and a dark type, of which the first alone —light hair and blue eyes—answers to the popular idea of the genuine German race. But in point of fact the most recent researches have shown that this fair complexion, usually taken as the test of the pure German, predominates overwhelmingly only in the North, that is to say, amongst the Low German tribes, from time out of mind in possession of the soil still held by them. The darkest districts are the southern border-lands, Alsace-Lorraine and Rhenish Bavaria. In the North the lightest element is found on either side of the Elbe and in farther Pomerania, though here also the frontier lands west and east—that is, the Rhine provinces and Silesia—show an increase in the dark shades. In general the three frontier rivers—Rhine, Danube, and Oder—mark the line of the darker races. Along these water highways flowed the great streams of migration; here the fusion took place in the south-west with the Latin and other dark elements, and in the south-east with still unknown foreign, but also dark, types.

GIRL FROM UPPER BAVARIA.

2. *Foreign Ethnical Elements among the Germans.*

Throughout South Germany and Helvetia both the aboriginal Kelts and the more recent Teutonic tribes became thoroughly Romanised, while also acquiring a large admixture of Roman provincial blood. But this very provincial element was often drawn from the remotest corners of the empire. Later on the Teutons absorbed much alien blood, owing to the large number of captives made by them during the Roman wars, while with the tribal migrations the slaves of foreign extraction became so numerous as to form the majority of the population in such places as the region of the Rhine and other parts of South Germany.

A still more extensive displacement of the Teutonic element occurred during the first half of the Middle Ages. The Hungarian wars must have occasioned the introduction of some Magyar or Finno-Tataric elements into South Germany. But the largest infusion of foreign blood was brought about through the wars with the Slavs. So late as the seventh century Slavonic tribes were still migrating into the Austrian Danubian lands, and the whole of the east Alpine region was occupied exclusively by the Slavs. So too all the country immediately to the east of the Elbe was Slav. Still farther east were the pagan Prussians, a Lettic or Lithuanian people akin to the Slavs, who offered the most desperate resistance to the proselytising sword of the Christian Teutonic knights. Not before the twelfth century was the greater part of the Slavonic (Wendish) element in North Germany finally destroyed, expelled, or absorbed. Most of the captives were either enslaved, settled in the country, or else distributed over various parts of Germany as far as the Rhine, Würtemberg, and Bavaria. From about the

ninth century hinds and menials of Slavonic blood were so common in Germany that the term *slave* came gradually to acquire its present meaning of bondsman, while still continuing to be used as the generic appellative of the Slavonic race.

The present Germans are therefore the result of a fusion of the original Teutonic stock, with a considerable amount of foreign blood, and are consequently as little identical with the old Teutons as are the Italians with the old Romans.

3. *The German National Character.*

The German national character is by no means of a uniform stamp, ethnical, historical, and social causes having prevented the development of a common national type. Thus, the wine-drinking and sanguineous Rhinelander is the very opposite of the beer-drinking and tobacco-smoking Bavarian. But, taking them all in all, and as at present constituted, the Germans may be described as of a phlegmatic, and partly even of a melancholic, temperament. In other respects they are distinguished by a number of brilliant qualities; though it should be observed that German estimates of themselves are apt to degenerate into something akin to self-glorification. This tendency has of late years become so general as to call for the sternest reproof on the part of all who have the true interests of the people at heart. Their industry, endurance, courage, loyalty, devotion, kindliness, love of freedom and of the family life, are universally acknowledged. But it is a sign of but little modesty to emphasise all these excellent qualities with the perpetual addition of the epithet "German"—German daring, German patience, German diligence, etc.—in such a way as to imply a monopoly of them. The German is doubt-

less a diligent workman, but in this he is surpassed, not only by the Englishman, but even by the Italian and the Frenchman; he has made many discoveries, but some other nations quite as many; he is frank and honest, but others are no less so, and knaves are to be met amongst all peoples. Courage and bravery are the common inheritance of all Aryan and of many non-Aryan races. Love of the family and of family life is more intense amongst the Slavs than amongst the Germans, while for this virtue the Jews of every clime stand pre-eminent. The German is religious, but also, like the Englishman and all other Teutons, an utter slave to dogmatism, whereas some of the Romance peoples have long since shaken off the yoke of theological teaching. In science the German intellect has achieved its highest triumphs; but, as a rule, the German mostly teaches formulæ, and acquires, not the virtues, but the vices of other nations.

4. *The non-German Populations of the Empire—French; Slavs—Tsekhs, Wends, Poles, Mazurians; Lithuanians; Jews.*

The non-German element of the population belongs partly to the Romance, partly to the Slavonic stock, to whom must be added 150,000 Danes in Sleswig. The Romance family is represented by the French and Walloons, the former mainly in Alsace-Lorraine, besides a few scattered settlements in Prussia. The French Huguenot villages in the Black Forest have long since become Teutonised. In Lorraine the French constitute probably one-half of the entire population, but in Alsace are in a decided minority.

To the Slav family belong the Tsekhs, Wends, and Poles. Of the first there are only about 50,000 within the limits of the empire, in Silesia; the second form an

isolated linguistic group of 140,000 in Upper and Lower Lusatia, belonging partly to the kingdom of Saxony, partly to the Prussian province of Brandenburg, a group which, being entirely surrounded by German-speaking populations, is destined at no distant period to become Teutonised. With the exception of the old generation, nearly all the Wends already speak two languages,—Sorb, as their Slavonic dialect is generally called, and German; and, as the young become daily more familiar with the latter, the time cannot be far distant when this district will become as thoroughly Germanised as so many other regions in the north-east of the empire.

Akin to the Wends, but speaking a Polish dialect, are the Kassubes or Kashubes, dwelling in the western division of the Prussian administrative circle of Danzig. These Kashubes, still numbering about 90,000, are a small but pure remnant of the Slavonic Pomeranians who formerly occupied this region, but have since become assimilated to the surrounding Teutonic element.

The main stock of the Slavonic population in the German Empire are the Poles, some two millions and a half altogether, principally settled in the Prussian province of Posen, but also found on either side of the Oder, in the south-east of Silesia. But here, no less than in Posen, the process of absorption in the German population has already made considerable progress.

Amongst the Poles must also be included the tribe of the Mazurians, dwelling in the south-eastern division of East Prussia. These Mazurs are the descendants of the Mazovians, a people akin to the Poles, whose Duke Konrad invited the Teutonic knights to Old Prussia in 1228 to protect him from the attacks of the pagan inhabitants of this country. Their speech is a corrupt form of the Polish language, held in great contempt by the educated Poles themselves, though the Mazurians

reciprocate the feeling by showing great contempt for the Poles, while they hold the Germans in high esteem. To this preference for the Germans must be attributed the fact that they are all Protestants, whereas the Poles proper, everywhere in Germany, are members of the Roman Catholic Church.

The series of non-German nationalities in the empire is brought to a close by the Lithuanians, numbering some 150,000, and dwelling in the extreme north-eastern corner of the State.

The Lithuanians are generally strongly built, and capable of enduring the greatest hardships. They have a fresh and blooming complexion, and continue to enjoy a vigorous constitution till an advanced period in life, hale old men of 70 to 80 being by no means rare amongst them. Their intellectual qualities are above the average, though they display a certain tendency to seclusion, due, doubtless, to their peculiar speech and social habits cutting them off from free intercourse with their neighbours. Their attachment to the old national traditions also stands in the way of their social advancement. They are all Protestants and very religious—no bad weather, great distances, or other impediments, keeping them from church on Sundays. The clergy enjoy great consideration amongst them, and in their troubles and sorrows they console themselves with the belief in predestination. On the other hand, they are said not to be over truthful in their commercial and ordinary dealings, and the vice of intemperance has also unfortunately spread with fatal consequences amongst them. As everywhere on the border-land of the Slavonic domain, the assimilation of the Lithuanians to the German element is progressing, and has been materially furthered by the development of the railway system. A few of the old people here and there, doubtless, still understand the

beautiful, sonorous, and marvellously preserved Lithuanian tongue, but the young know only a few words or sentences, and are often even ashamed of understanding so much.

Finally, the Jews form a considerable element in the population of Germany. They are relatively six times as numerous there as they are in the United Kingdom, amounting to about 1·3 per cent of the population. They are most numerous in the east, in the once Polish province of Posen, where they make up nearly 4 per cent of the inhabitants, but they are likewise abundant in some parts of the west, as in Alsace-Lorraine and the Grand-duchy of Hesse, where they amount to 3 per cent, or nearly that proportion. Everywhere they show a tendency to disappear from the agricultural districts and congregate in the large towns. From this cause the Jewish population in Berlin has grown from about 2 per cent of the entire population in 1840 to nearly 5 per cent at the present day; and as the Jews always exhibit a peculiar faculty for acquiring a large share of the capital wherever they are settled, they generally rouse a strong feeling of jealousy and dislike towards them among the rest of the people. This antagonistic feeling is intensified by the oppressiveness with which they are said to use the influence which their command of capital secures for them, and also by the exclusiveness by which the Jewish race is everywhere characterised. Hence in Berlin especially the Jews have recently become the objects of a peculiar antipathy, which has occasionally expressed itself in a violent anti-Semitic agitation.[1]

5. *Extent, Constitution, and Government of the Empire.*

In its present limits the German Empire is based on

[1] See Andrees, *Volkskunde der Juden:* Leipzig, 1881.

the treaties between the States of the former North German Confederation and the South German States (November 15, 23, and 25, 1870, and ratified on January 9, 1871), and on the law decreeing the incorporation of Alsace and Lorraine passed on June 9, 1871, after these two provinces had been ceded by France to Germany at the treaty of peace concluded in Frankfort-on-the-Main on May 10, 1871. The German Empire now accordingly consists of 22 sovereign, and three republican, States, besides the imperial district of Alsace-Lorraine, in which the Emperor exercises political power (see Statistical Appendix). The King of Prussia is also at the same time Emperor of Germany, which, as now constituted, is a Confederacy of States with constitutional forms. Hence, according to the intention of the powers framing the constitution, the German Empire is a monarchy, and the head of the government a sovereign, who, however, does not exercise without restraint the supreme power inherent in the Confederacy. On the contrary, the constitution, as representing the imperial authority, names as the presidium of the Confederacy, in the first instance, the King of Prussia, with the title of German Emperor; then a Confederate Council, consisting of the plenipotentiaries of all the separate States; and lastly, the parliament or "Council of the Empire," chosen by direct election as representing the whole nation. All imperial measures, which require to be passed by a majority of the two assemblies just mentioned, receive their binding force by imperial proclamation. The administration of the empire is entrusted to the Imperial Chancellor, who, though named by the Emperor, is constitutionally responsible, is president of the Confederate Council, and controls the general management of affairs.

Although the imperial constitution does not infringe upon the sovereign rights of the various members of the

Confederation, still the imperial authority, with a view to uniformity in certain departments, regulates a number of matters otherwise usually regarded as the prerogatives of the individual States. Such are—the diplomatic representation abroad; the army and navy; the finances; railway, postal, and telegraphic affairs.

It follows also from the very nature of the case that the enormous predominance of Prussia—in extent and population five times greater than Bavaria, the next largest state in the empire—presses more and more on the independence of the other members of the Confederation, and while leaving them an outward show of sovereignty substantially limits its exercise to the administration of their internal affairs. Hence, as might be expected, Berlin, the capital of the Prussian monarchy, is also the seat of the imperial Government.

6. *Berlin, Capital of the Empire.*

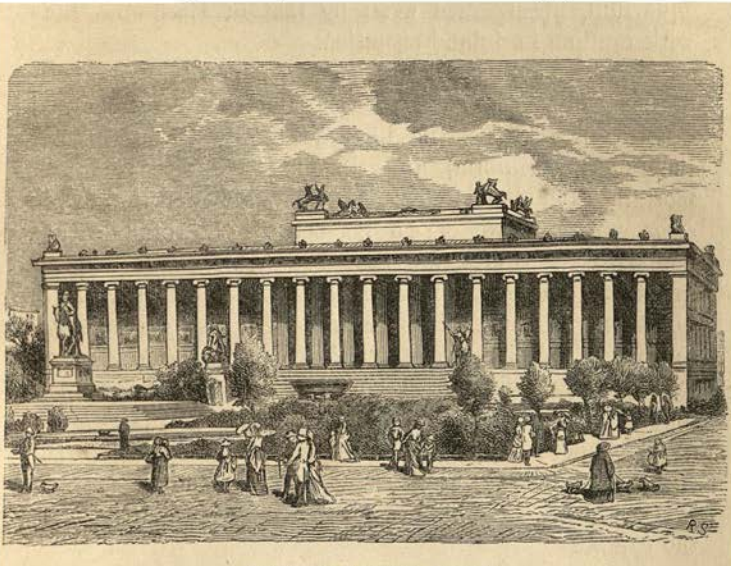
For the metropolis of a great empire Berlin is very inconveniently situated on the banks of the little river Spree, in the midst of a sandy, unattractive country. At the census of December 1, 1880, its population amounted to upwards of 1,120,000. The name of the place is Slavonic, in which language *bar*, *bara*, and *brljina* means a muddy, sluggish stream, and such the Spree may well have been at the time when, and at the spot where, Berlin was founded by the former Slav inhabitants of the present Brandenburg. This still far from romantic stream forms an island in the centre of the city, on which stood the old Köln, and the older parts of the town round about this spot are within the circuit of the former moat of the fortress. On this island are now situated the Royal Palace, the Cathedral, the Old and New Museum, the National Gallery, and other important

buildings; and from it "Unter den Linden," the finest and most frequented thoroughfare in Berlin, leads westwards to the Brandenburg Gate, beyond which lies the Thiergarten. Formerly an uninteresting place, Berlin has been greatly improved of late years, and now boasts of a considerable number of public monuments. Nor

THE ROYAL PALACE, BERLIN.

does it lack a certain historic character of the genuine Prussian type, these very monuments mostly breathing a warlike spirit, and harmonising well with the capital of a great military power. Here is the equestrian statue of the Great Elector, recalling the days when the German lands were overrun by victorious Swedish hosts. Not far off we are reminded of the Seven Years' War by the famous monument of Frederick the Great, with its lifelike

plastic reliefs, and by the statues of the leading captains of those stirring times. The national rising of 1813 is represented on the Kreuzberg and Belle Alliance Platz by six figures of well-known Prussian heroes, erected close to the Arsenal. And with all these records of bygone times must now be included the monument of Frederick William III., which, with its surroundings, has added



THE NEW MUSEUM, BERLIN.

considerably to the appearance of the large open space between the royal palace and the museums; and, lastly, the much criticised column of Victory, which commemorates the Franco-Prussian war of 1870-71, the last great triumph of the Prussian arms.

The last few years have also witnessed the unveiling of two monuments of a more peaceful character—the statue of Schiller in front of the theatre, and the bust of

Hegel the philosopher in the secluded chestnut grove behind the university.

Beyond the Brandenburg Gate Berlin has recently made rapid strides in the direction of Charlottenburg, round about the Thiergarten and the Zoological Gardens. These have been greatly improved, and are now really worthy of the capital. There is also a magnificent aquarium, unsurpassed even by that of Hamburg, notwithstanding its inland situation.

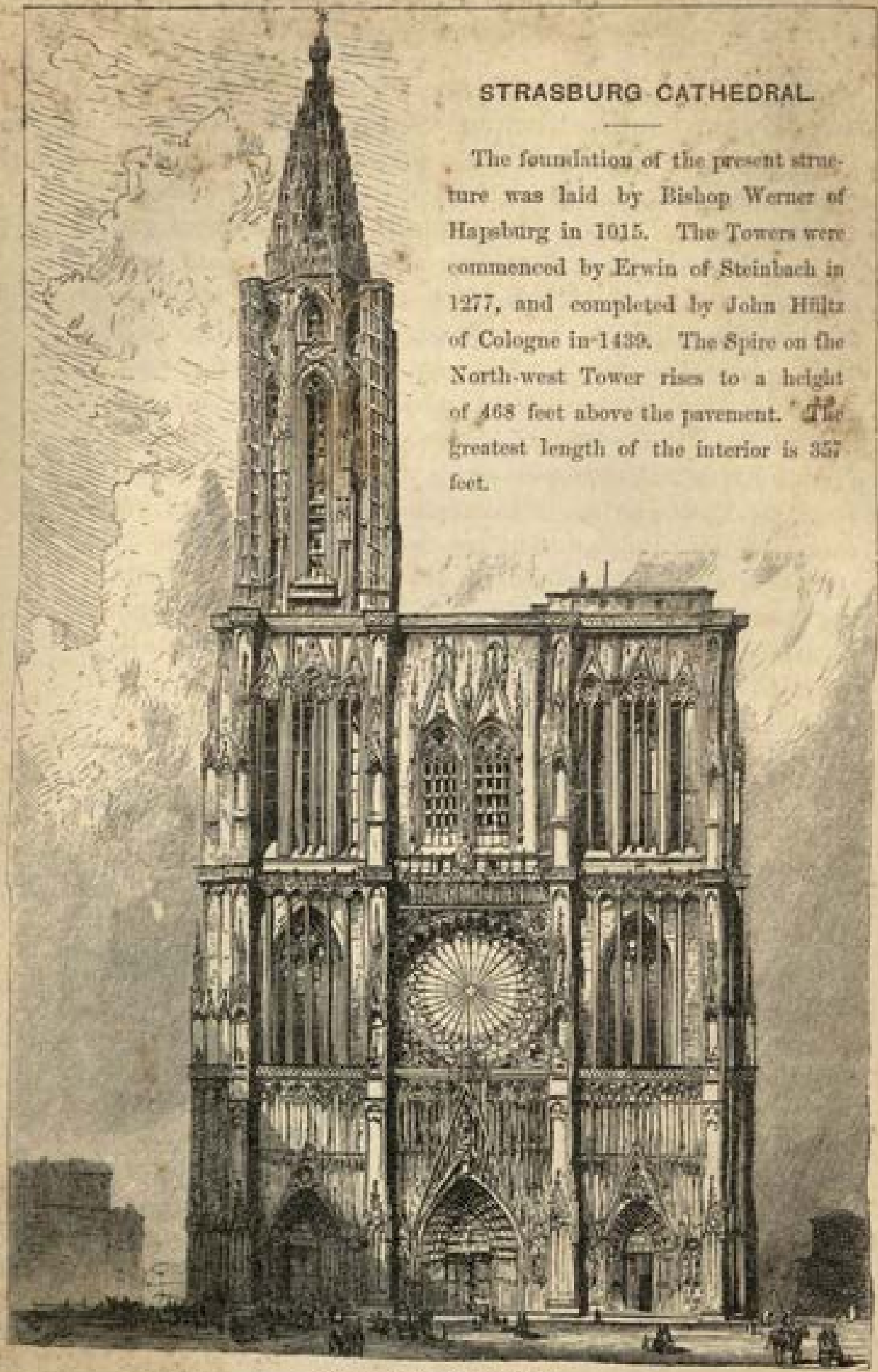
Unfortunately the social, economical, and sanitary conditions do not keep pace with the material and æsthetical progress of Berlin. The high death-rate (about 30 per thousand per annum), and the excessive rate of infant mortality (children under one year old making up in some years upwards of 45 per cent of the total deaths), both bear witness to the extent to which overcrowding prevails. The evil is intensified by the great increase of house-rent; by the disappearance of open spaces in the interior of the city, every available piece of ground being at once seized upon and covered with houses; by the consequent deterioration in the general health of the people; and lastly, by an unprecedented increase in the criminal element, the most abandoned characters from every part of the Empire continually gravitating towards the capital.

7. *Hamburg, Frankfort, and other Towns.*

Besides Berlin, which certainly far surpasses all other cities in the Empire, there are many other large, handsome, and populous towns in this State, in their general aspect differing more widely from each other than is perhaps the case in any other European country. Foremost amongst the commercial centres are:—Hamburg (410,000), on the Elbe, next to Berlin the largest and most populous city in the Empire, and next to London and Liverpool

STRASBURG CATHEDRAL.

The foundation of the present structure was laid by Bishop Werner of Hapsburg in 1015. The Towers were commenced by Erwin of Steinbach in 1277, and completed by John Hültz of Cologne in 1439. The Spire on the North-west Tower rises to a height of 468 feet above the pavement. The greatest length of the interior is 357 feet.



STRASBURG CATHEDRAL.

To face page 369.

the first seaport in Europe; Bremen (123,000), on the Weser, the second seaport in Germany; Frankfort-on-the-Main (165,000), for some time capital of the old Germanic Empire, at present the centre of the traffic in the south-west; Leipzig (250,000), metropolis of the book trade; Breslau (273,000), with its important wool market; and Stettin (92,000), the principal trading-place in the Baltic, in this respect now surpassing both Königsberg (141,000), "the city of pure reason" (so-called as having been the residence of Kant, and the birthplace of the Kantian philosophy), and Danzig (109,000), which latter town is from the architectural point of view the most interesting and original of all those on the Baltic. The two last-named still remain the most important places in the north-east; while, in the south, Munich (247,000), the art-loving Bavarian capital, considerably excels both the hill-encircled Stuttgart (117,000), and the finely-built Karlsruhe (49,000), with its imposing railway-station,—capitals of Würtemberg and Baden respectively.

On the Rhine we meet the grand fortified towns of Strasburg (104,000), in Alsace, and Mayence (61,000), in Hesse; and farther north, Cologne (160,000), in the Rhine province; Aachen, or Aix-la-Chapelle (86,000), where the emperor was formerly crowned; Düsseldorf (95,000), "the city of the painters;" and the industrial double towns of Barmen and Elberfeld (together 190,000). In the north-west the populous towns of Hanover (123,000), and Magdeburg (137,000), deserve mention; and in Saxony its capital, the attractive and charmingly situated city of Dresden (220,000).

8. *Agriculture—Manufactures—Trade and Commerce.*

The inhabitants of the German Empire derive their

chief support from the cultivation of the soil, although, with the exception of the terrace lands sloping from the central highlands, and most of the river valleys, the ground is not very fertile. But agriculture, for the improvement of which technical schools and model farms have been established in all the German States, has arrived at such perfection as to be surpassed by Western Europe alone. Various cereals, especially wheat and rye, are cultivated, besides potatoes, vegetables, root and green crops, excellent fruits and wine. Without pretending to compete with the French vintages, the numerous German wines, those especially of the highly-favoured Rhine valley, enjoy a general and well-deserved reputation.

The manufacturing industries are doubtless very important, and in some branches large quantities of manufactured goods are exported. Still the trade returns for the last few years show that Germany is capable of supplying no more than two-thirds of her own demands, being thus compelled to import fully one-third.

Amongst the most important industries are—wool in the Rhine lands, Silesia, the kingdom of Saxony, and Würtemberg; linen in Lusatia, Silesia, Westphalia, and Ermeland; iron wares mainly in Essen, Westphalia, where are the famous Krupp steel-works, the largest in the world. A very extensive trade is also done in wooden ware, notably in the south; but, on the other hand, the German glass-works can compete neither with those of France nor of Bohemia. In a word, the Philadelphia Exhibition of 1876 confirmed the impression already produced by that of Vienna in 1873—that the German industries do not hold their own with those of other manufacturing countries.

A far more satisfactory picture is presented by the recent development of German trade. While the movement in the interior is furthered by an excellent and con-

NUREMBURG. *To face page 270.*

stantly expanding railway system, its foreign trade, notwithstanding its far from favourable geographical position, has already called into existence a mercantile navy surpassed in amount of tonnage by those of England and the United States alone. The strong tendency of the people to settle permanently in foreign lands, where they, as a rule, renounce their own nationality sooner than any other European people, has, however, meantime, given occasion to the establishment of German commercial houses in every part of the world. It often happens even that in some of the most remote regions the trade has been monopolised, or very nearly so, by the Germans, who now supply the home country with the products of every zone.

9. *Culture—Public Instruction—Religion.*

The triumphs achieved of late years have been largely due to the high degree of intellectual culture attained to by the German people. Their educational, like their military system, already enjoys universal recognition, and the various provincial universities, twenty-one in number, are rivalled by those of Austria and Switzerland alone. Secondary schools are also well organised and sufficiently varied in character to be adapted to the needs of different sections of the community, whether professional, commercial, or industrial, while elementary education is made compulsory on all by law, and the law is so well carried out that almost all children of school age are actually in attendance at school. It is noteworthy, that of all the Germanic States Prussia has for a long time paid most attention to educational matters, so that there is now scarcely a village to be found in that country without its national school.

In religious matters the German Empire does not

present quite so satisfactory a picture. The nation is unfortunately divided into a Protestant majority and a Catholic minority—a minority, however, large enough seriously to affect the religious uniformity of the country. The Protestant element predominates in the north, the Catholic in the south, though not by any means to the same extent. There are nearly 70 per cent of Protestants in the north, and over 37 in the south. Under this name are comprised the Lutheran, Reformed, and United Churches.

The so-called Old Catholic party, though worthy of mention as a phenomenon peculiar to the German national temperament, is too insignificant in itself to modify the religious atmosphere of the State.

CHAPTER V.

SWITZERLAND.

1. *Government—People—The Rumonsh or Ladin Race and Language.*

AMONGST the various political forms of government developed in Europe that of a federal republic has been realised by the neutral State of Switzerland alone. It consists of a confederation, "Eidgenossenschaft," of twenty-five independent little *cantons*, as they are called, mostly named after their chief towns, and governed each according to the constitution best suited to its own requirements. In these various constitutions there are gradations from the fullest democracy to the purest representative forms; but pure non-representative democracies have been adopted in the smaller cantons only, such forms of government being in fact impracticable except amongst small populations.

The bulk of the population is of Teutonic race, but the Latin race (represented partly by French, partly by Italians) makes up three-sevenths of the whole. The Swiss Teutons belong to the Alemannic stock, and still speak a difficult Alemannic dialect, usually called Swiss German, or simply Swiss. They occupy the whole of the Upper Rhine valley, as far as its extreme western angle at Basel, consequently the whole of the Helvetian highlands lying north of the Central Alps, besides the

Upper Rhone valley as far down as Sion or Sitten, under the Bernese Alps. The remainder of the Upper Rhone valley and the western slopes of the Jura are French; this region comprising the cantons of Valais, Vaud, Geneva, and Neuchâtel. Lastly, the south-eastern extremity, including the magnificent highlands of the Ticino, and the southernmost valleys of the Grisons, belong to the Italian domain.

In the sunny valleys of the Grisons, along the head streams of the Rhine, and in the region between these rivers and the banks of the Upper Inn, and even still farther eastwards, in some Tyrolese valleys beyond the Swiss frontier, we find the Rumonsh or Ladin-speaking people, whose language at first sight seems like a sort of connecting link between German and Italian. These are the interesting Rhæto-Romance tribes, which had long failed to receive that attention in the scientific world to which they are undoubtedly entitled. But since the critical works of such writers as Lorenz Diefenbach and Fr. Diez, the idiom now spoken by these Rhæto-Romance people of the Grisons and Tyrol has been recognised as a thoroughly independent Neo-Latin tongue, standing on the same level as the Portuguese, Spanish, Langue d'Oc, Langue d'Oïl, Italian, and Moldo-Walachian.

Nor are these people less interesting from the ethnological than from the linguistic point of view, though the researches in this direction have been far less extensive, and leave many gaps still to be filled up. The question whether, and how far, the Rhæto-Romance race is connected with the old Rhætians can here be no more than referred to. It is, however, on the whole, probable enough that they are a mixture of the Romans, who, between the years 16 and 12 B.C., completed the subjection of the Alpine highlands, maintaining their supremacy there till

the time of the Teutonic migrations, and of the aboriginal populations of those regions spoken of by the old writers under the name of Rhætians. These Rhætians were formerly far more widely diffused than at present. Numerous local names, scattered all over Tyrol, still bear witness to their former presence in that province, and the present Ladins of the south-eastern valleys of Tyrol are kinsmen of the inhabitants of the Grisons both in blood and speech. However, the mixed Rhæto-Romance populations elsewhere yielded in "the struggle for existence" to the vigorous Teuton tribes, a pure race pressing upon them from two directions—from the north as Bayuwars, and from the south as Longobards (Lombards), surging up through the valley of the Adige or Etsch. They thus became at last confined to the solitary upland valleys, where they still continue to eke out a laborious existence. Their speech too is steadily yielding to encroachments both from the north and south, and is gradually getting supplanted either by German or Italian. They are altogether a doomed race, and one of the most instructive illustrations of the struggle for existence in the domain of ethnology.

2. *Agriculture—Industries—Chief Towns: Geneva, Bern, Basel.*

The Swiss depend for their support on various branches of industry. In the lowlands the chief occupations are agriculture, horticulture, and wine-growing. The last is carried on to a greater or less extent in twenty cantons, but yields the largest returns in the neighbourhood of the great lakes of Geneva, Neuchâtel, Zürich, and Constance. Nearly all the towns, with their various industries, are also situated in the lowlands.

Foremost amongst the few important towns in Swit-

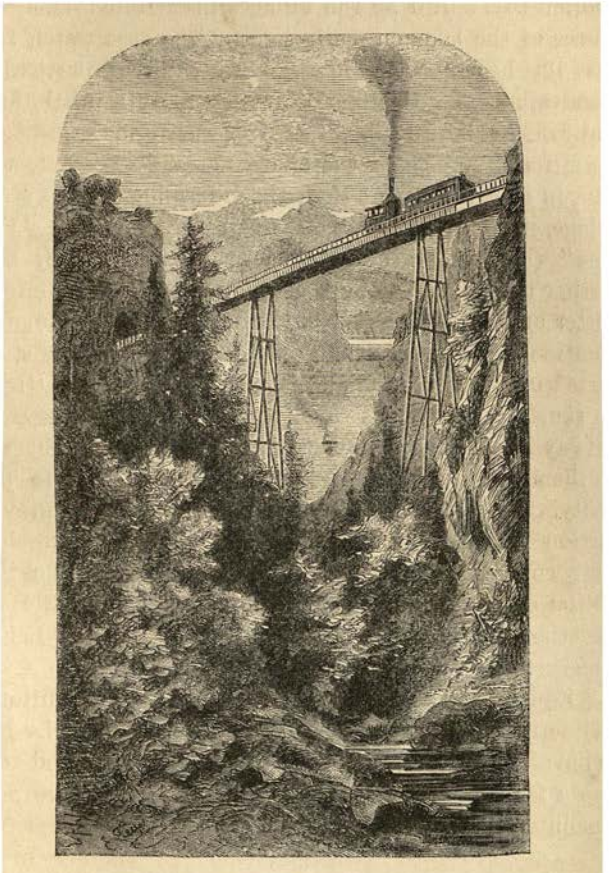
zerland is Geneva, with its 70,000 inhabitants,[1] once celebrated as "the Calvinistic Rome," but now better known as a seat of gaiety and a centre of science and learning. Next in size is the trading city of Basel (Bâle) (61,000 inhabitants), which is supposed to be the wealthiest town in the country. Bern, the federal capital, ranks third only in point of population (44,000), and, like the other two, is situated in the west, which,

TELL'S CHAPEL, LAKE OF LUCERNE.

with the north-east, is the chief centre of the industries. In the northern cantons of Zürich, Zug, Glarus, and Thurgau, cotton-spinning is most actively carried on, and in Appenzell and St. Gall the manufacture of muslin. Specially noteworthy are the cotton and other manufactures of Glarus, as illustrating the manner in which industry and intelligence can triumph over natural disadvantages. Carried on in a remote mountain valley in the very heart of Europe, where only a fifth part of the surface is fit for the plough, and where the inhabit-

[1] Including suburbs.

ants have to make the torrents and waterfalls compensate for the absence of fuel as a motive power, their products



THE RIGI RAILWAY.

are nevertheless sent to the farthest east and the farthest west, to China and America, as well as to the nearer parts of Europe and Africa.

The centre of commerce in the north-east is Zürich, on the lake of like name, with a population of 25,000, swollen to 76,000 by the villages that stretch along the shores of the lake on both sides. The vast watch trade has its headquarters in the west, more particularly Geneva, and La Chaux de Fonds (22,000 inhabitants), and Locle (10,000 inhabitants) in the Jura.

In the highlands there are naturally no industries, and, in fact, little more than sheep-farming with a scanty tillage, many of the upland grazing-grounds, the "Fore-alps" (locally *Maiensässen*), as they are called, being further utilised for cattle-breeding and the production of butter and cheese, carried on in a very efficient manner. Mention may also be made of the numerous hotels, supported by the vast number of strangers annually attracted to the Alpine regions by their romantic scenery. Of railway lines there is in fact a superabundance, but most of them lack the material conditions essential to prosperity. Reference has already been made in the previous portion of the work to the great mountain tunnels in their course, in operation or contemplation. The illustration on the preceding page represents the little railway that ascends the Rigi from Vitznau, on the Lake of Lucerne.

Educational matters receive the greatest attention in Switzerland. There are universities in Basel, Bern, Geneva, and Zürich, and in the last-mentioned town also a far-famed polytechnic institution, with admirably-appointed laboratories and museums.

CHAPTER VI.

THE AUSTRO-HUNGARIAN MONARCHY.

1. *Extent—Population—Heterogeneous Ethnical Elements.*

If not the most remarkable, certainly one of the most singularly constituted States in this continent is the Austro-Hungarian monarchy, the population of which is of a far more heterogeneous character than that of any of the States hitherto passed in review. It is indeed a remarkable fact that the countries of Western Europe are the most uniform in respect of their inhabitants, this homogeneous character growing perceptibly less as we proceed eastwards. In the German Empire we had to consider the presence of diverse fragmentary ethnical elements; but in Austro-Hungary, Russia, and the Balkan Peninsula, the ethnographic relations become almost indescribably intricate.

Although belonging geographically to Central Europe, Austro-Hungary must be ethnically included in Eastern Europe, both on account of the peculiarity just mentioned and for many other reasons; nor should it be forgotten that the political status of countries is estimated mainly by this ethnical consideration. By Eastern Europe is here understood that vast region where the Slavonic element predominates, as compared with the Romance or Neo-Latin world of the west and south, and the Teutonic of Central and Northern Europe. Now this preponderance exists in Austro-Hungary no less than in Russia and the

Balkan Peninsula. Hence, notwithstanding the other mostly numerically insignificant inhabitants of this region —Roumanians, Albanians, Greeks, Jews, Gipsies, Magyars, Finns, and Turks, Tatars, Bashkirs, etc.—we are clearly justified in speaking of a Slavonic East, even though the Slav element is not at the same time everywhere politically paramount in this division of the continent.

In the Austrian Empire the Germans, who are at the head of the government, and whose speech is the official language in the army and navy as well as in the administration of the western portion of the empire, form no more than one-fourth, and the Magyars somewhat over one-seventh, of the entire population.

The political inferiority of the Slavs, notwithstanding their numerical excess, is explained by the fact that they are themselves split up into various branches, often separated from each other by intervening peoples, whereby the mixture of races in the monarchy is itself considerably increased. For here we have Tsekhs, Poles, Ruthenians, and Great Russians, Slovenians, Croatians, and Serbs, besides 30,000 Bulgarians. All these groups belong either to the northern or southern branch of the Slavonic family, —the Tsekhs of Bohemia and Moravia, with their kinsmen the Slovacks of North Hungary, the Silesian and Galician Poles, and the Ruthenians and Great Russians of Galicia and Bukowina, to the former; all the others to the latter.

Wedged in between these two great groups are the Magyars of the Hungarian plains, with the Roumanians of South Hungary, Transylvania, and Bukowina bordering them on the east, and the Germans on the west. These last occupy in a compact body both Upper and Lower Austria; Salzburg on the frontiers of Bavaria; and Carinthia and Styria east of Tyrol. There is also a broad Teutonic belt encircling the Bohemian basin, be-

sides isolated German-speaking communities scattered all over the monarchy, as far as its easternmost limits. Of these the most considerable are the Gottschee in Carniola, the upland towns and the Zips of North Hungary, the German colonies in the Banat of south-eastern Hungary, and the Saxons of Transylvania. Any good ethnographic map of the monarchy—such, for instance, as that of Carl Baron Czoernig—will show at once that there is scarcely a single province or "crown land," as the provinces are here called, entirely occupied by a homogeneous population. Austria is, in fact, the most polyglot of European States.

2. *Dualistic Government.*

Austro-Hungary constitutes a hereditary constitutional monarchy divided into two very unequal portions, one of which embraces "the kingdoms and lands represented in the Imperial Council," the other comprising "the lands of the Hungarian Crown." Instead of the first of these expressions, the almost equally inconvenient term "Cis-Leithan" has been generally adopted in contradistinction to the lands of the Hungarian Crown, which are then spoken of as the "Trans-Leithan" provinces. Both divisions really form two distinct States, with separate governments, political institutions, and, what is still worse, with utterly antagonistic interests, currents of thought, and national sympathies. The district administrations extend even to the postage stamps and coinage; in the Cis-Leithan provinces there is an Upper and a Lower House, in Hungary a "Tafel," or Chamber of Magnates, and a Tafel of the Commons. Affairs of common or imperial interest are transacted by the "Delegations" chosen by these four assemblies, and even here there is a Cis-Leithan and a Trans-Leithan Delegation, meeting alternately in Vienna and Pest, capitals of

Austria proper and Hungary respectively. In the former State every crown land has its own diet for the administration of its local affairs, while in the latter Croatia and Slavonia alone enjoy this privilege. Quite exceptional is the position of Dalmatia, which, though recognised in 1868 as forming part of the so-called "Triple Kingdom" of Croatia, Slavonia, and Dalmatia, is still included amongst "the kingdoms and lands represented in the Imperial Council." It accordingly sends its representatives to the Lower House in Vienna, and is administered *de facto* by the Cis-Leithan Government. This dualistic *régime* naturally requires the appointment of separate ministers for each division of the monarchy, besides which there are three ministries common to both, and representing such functions as are still administered without reference to the twofold partition of authority in other respects. These are the ministry of the imperial household and foreign affairs; the ministry of the imperial finances providing for the common expenditure, towards which the Austrian division contributes 70 per cent and the Hungarian 30; lastly, the imperial ministry of war, administering the army, whose supreme commander-in-chief is the Emperor.

3. *The Austrians Proper—Upper and Lower Austria—Vienna.*

The inhabitants of Upper and Lower Austria are Germans, at least in speech, and seemingly related to the neighbouring Bavarians. But, as the country south of the course of the Danube had long been peopled by Slavs, the two elements have here been extensively intermingled, as shown even by the Austrian High German dialect, which has adopted numerous Slavonic terms and expressions. There are, moreover, certain Tsekh and

Croatian elements still actually surviving in Lower Austria, though doubtless only in small quantities. Hence the Austrians are, strictly speaking, a mixed race, whose Teutonic outward aspect is of very recent date. They are also essentially different from their German neighbours in their intellectual qualities and natural disposition, being characterised by great cheerful-

ELISABETH BRIDGE, VIENNA.

ness and kindliness, together with an undeniable inclination for material or sensuous pleasures.

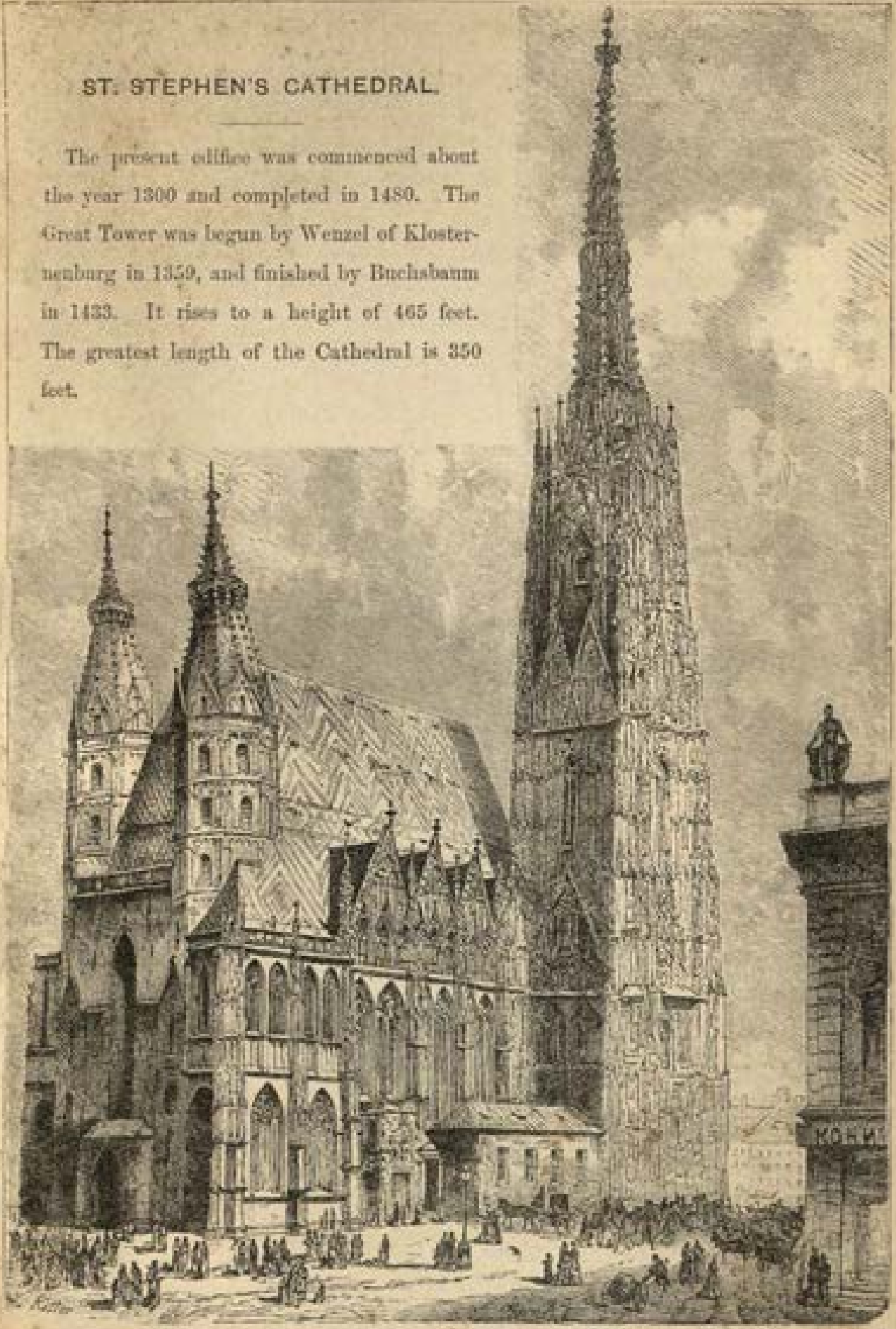
Both the best and worst sides of the Austrian character are most highly developed in the inhabitants of Vienna, at once the capital of Lower Austria and metropolis of the monarchy. Situated near the Danube, which it promises some day to reach, and intersected by a channel of this recently-embanked stream, Vienna occupies an area of over 21 square miles, without reckoning the suburbs, covering 35 square miles. The population amounted, at

the census of December 31, 1880, to 1,104,000, of whom 726,000 resided in the ten wards of the inner town. Since the old fortifications have been levelled and laid out in spacious boulevards, with monumental structures in the Paris style, Vienna has become one of the most brilliant capitals in Europe. These boulevards, or the "Ringstrasse," as they are called, enclose the old heart of the city—in fact, "the City," as it is usually spoken of by the inhabitants, everything outside of this circle being regarded as suburbs. In "the City" are all the finest warehouses, commercial establishments, palaces of the nobility and foreign ambassadors, government offices, and the imperial "Hofburg," or palace itself, a structure more remarkable for its size than its beauty. In the very centre of "the City" rises the grand old Gothic cathedral of St. Stephen, with its graceful spire no less than 475 feet high. There are also some fine palatial residences in the environs, whose ornamental grounds are generously thrown open to the public; besides which Vienna boasts of some splendid art collections (including an excellent picture-gallery in the Belvedere), one of the largest libraries in Europe, a university and academy of the sciences, together with many other scientific institutions; and, lastly, a far-famed theatre.

Numerous silk, cotton, woollen, leather, hardware, musical instrument, porcelain, and carriage factories, in the suburbs, contribute largely to the wealth of the place. A railway system, radiating in all directions, helps to promote the large trade carried on, especially with Russia and Turkey through Hungary, and through Trieste with the Levant and Italy. All this, combined with its Parisian refinement and gaiety, and the various polyglot elements and national types here gathered from north, south, east, and west, imparts to Vienna a thoroughly cosmopolitan character. The inhabitants themselves—a

ST. STEPHEN'S CATHEDRAL.

The present edifice was commenced about the year 1300 and completed in 1480. The Great Tower was begun by Wenzel of Klosterneuburg in 1359, and finished by Buchsbaum in 1433. It rises to a height of 465 feet. The greatest length of the Cathedral is 350 feet.



ST. STEPHEN'S CATHEDRAL, VIENNA.

To face page 584.

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SALZBURG. *To face page 385.*

more mixed race, if possible, than the ordinary Austrians of the lowlands—have developed a taste for the beautiful, and a sense of what the Parisians call *chic*, the Viennese *fesch*,[1] universally displayed in the dress, the manners, and social life of the people. Favourite places of resort are the imperial country seats of Schönbrunn and Laxenburg.

Prominent features of Lower Austria are the great monastic foundations, with their sumptuous buildings, and the many ruined castles, several of which adorn the highly romantic course of the Danube between Melk and Krems. But neither here nor in Upper Austria are there any towns calling for special mention, except perhaps Linz (42,000), capital of the latter province, pleasantly situated on the Danube. However, the charming little town of Ischl in the Salzkammergut, with its famous mineral waters and salt works, is well worth a visit.

4. *Duchy of Salzburg—Tyrol and Vorarlberg.*

In the sparsely-peopled Duchy of Salzburg the only important town is the capital of like name (23,000), one of the most romantically situated cities in all Europe, a city which, owing to its Italian style of architecture, has received the name of "the German Rome." The archbishop of this see bears the title of "Primate of Germany," and it may be mentioned that its first bishop was the Irishman St. Virgilius, one of the most enlightened men of his time (eighth century). He was the contemporary, and in some respects the rival, of St. Boniface, the English apostle of Germany. Amongst the mineral waters of the duchy, those of Wildbad Gastein enjoy a European reputation.

[1] Answering to such English expressions as "good form," "style," and the like.—*Trans.*

The adjoining crown-land of Tyrol[1] is divided by the main chain of the Alps, both physically and ethnically, into a northern or German and a southern or Italian Tyrol. The whole country is thinly peopled, but in the north even more so than in the south. The German Tyrolese is honest and loyal, simple and candid in his demeanour, and devotedly attached to his sovereign. With the neighbouring Bavarians he associates mostly somewhat cautiously, for he is above all a strict and even bigoted Catholic, entirely under the influence of the priest, and strongly opposed to the presence of other religionists in his romantic land. His intellectual culture stands on a low level, and there are but few industries in a country mainly occupied with Alpine farming. The inhabitants of the Ziller, Teffereggen, and some other valleys, migrate annually abroad, returning in winter with their summer earnings.

Although this northern portion has been pretty generally Teutonised, there still linger unmistakable Slavonic traits in the popular types about Lienz, in the Kalser, Teffereggen, and Hochpuster valleys, and even in Italian Tyrol itself. On the other hand the 20,000 Ladins, occupying several valleys in the south-east, are a Romance people, akin to the Swiss Rhæto-Romanians. In this northern division lies Innsbruck (that is, Inn-Bridge, like Cambridge), with a population of 30,000, including suburbs. It possesses a university, and the same privilege is enjoyed by Feldkirch (3500), the little capital of Vorarlberg.

Far more favoured by nature than the northern is the southern or Italian division of Tyrol, with the glorious

[1] *Tyrol*, not *the Tyrol*, as we often see in English works. The article has been introduced probably through a slavish translation of the Italian expression *il Tirolo;* but it is as absurd to speak in English of *the Tyrol*, as it would be to say *the Germany, the Italy.—Trans.*

valley of the Etsch or Adige, along which are situated a number of towns of some importance, such as Botzen or Bolzano (11,000), near the famous sanitorium of Meran, the episcopal town of Trient or Trent (20,000), celebrated in history as the seat of the great council of the Church summoned to settle the disorders due to the Reformation, and Roveredo (9000), seat of the silk trade. Botzen still lies within the limits of the German-speaking division, but it threatens soon to be absorbed by the constantly encroaching Italian element—an encroachment which is natural and indeed inevitable in a country whose intercourse lies almost exclusively with the south.

5. *The Duchy of Styria—Carinthia—Carniola—Istria—Trieste.*

Like Tyrol and Salzburg the Duchy of Styria is also ethnically divided into two portions, the north being German, and the south Wendish or Slovenian, with a few German-speaking communities intermixed. In the German domain lies the fine and important town of Graz, capital of the duchy, with nearly 100,000 inhabitants and a university. In Southern Styria, close to the line of demarcation between the Teuton and Slav elements, are Marburg, an episcopal town with 18,000 inhabitants; and Cilly (5000), with its abundant mineral waters, mostly hot sulphur springs.

With the kingdom of Illyria, comprising the provinces of Carinthia, Carniola, Görz and Gradiska, Trieste and Istria, we enter a more decidedly Slavonic region of the empire. German predominates in Carinthia alone, a highland district comprising the valley of the Upper Drave. Here Slavs of the Wendish stock are found, the few Germans being confined to the tract stretching

from Klagenfurt (19,000), capital of the province, south-eastwards to the Carniolan frontier.

On the other hand, Carniola itself, mainly filled by the Karst or Julian Alps, is peopled almost exclusively by Wends or Slovenians. A few isolated German communities occur only here and there, including, however, the somewhat extensive district of Gottschee on the Croatian frontier. In Laibach (26,000 inhabitants), capital of the province, as well as in some other places, both languages are spoken; but in the coast-lands there now remain only two small German colonies—those of Görz on the Isonzo (20,000 inhabitants), and Trieste (including suburbs, 133,000), on the Adriatic. This fine and regularly-built seaport—not only the most important city in Illyria, but also the most considerable emporium in the empire—has risen greatly in importance since the opening of the Suez Canal, and is now the successful rival of the neighbouring Venice. With Trieste, whose territory is exclusively Slovenian, the Slavs begin to be replaced by the Italians, who are also elsewhere met with along the northern and eastern seaboard

6. *The Slovenian Slavs—Dalmatia.*

As constituting the main element of the population in Illyria, the Slovenians have some claim to our consideration in this place. They number, altogether, perhaps about 1,356,000—26,000 in Venetia, 50,000 in Hungary, 350,000 in the coast-lands, 100,000 in Carinthia, 380,000 in Styria, and 450,000 in Carniola. They thus come in direct contact not only with other Slavonic races, but also with the other two main elements of the European continent—the Teutonic and Neo-Latin; and though thus exposed both to German and Italian influences have not only hitherto maintained their ethnical

independence, but have naturally striven to drive the Slavonic wedge continually farther in between the two. The Slovenian is generally of a vigorous build, and even the women, who are mostly well-favoured, have tall slim figures, with a fresh appearance and kindly expression. Their symmetrical forms are further improved by their picturesque costumes, which, however, like so many other national peculiarities, have already begun to feel the levelling influences of modern culture. The inhabitants, especially of Upper Carniola, are thoughtful and peaceable, proud, industrious, and intelligent. This mentally and physically healthy race enjoys a bright and cheerful existence in the midst of the glorious nature by which it is surrounded, thankful for the certain present, without anxiety for the unknown to come. Lower Carniola is the cradle of the most delightful popular songs and legends, while at the same time it presents in its Roman remains a fruitful field for the researches of the archæologist.

The narrow and barren strip in the south-west of the Empire is one of the most backward portions of the Austrian dominions, but more may be expected to be done for its intellectual and material improvement since the inland provinces of Bosnia and Herzegovina have been brought under Austrian occupation. In Dalmatia the German element ceases altogether, the higher culture being represented by the Italians alone, who live exclusively in the towns, and monopolise the trade of the country. They are found principally in Zara (12,000), capital of the kingdom, and in the equally small coast towns of Sebenico, Trau, Spalato, and Ragusa, as well as in the seaports of Lesina and Curzola on the islands of like name. The interior is occupied by a much-neglected population, in the south consisting mostly of Morlaks round about the famous Bocche di Cattaro, and akin to the neighbouring Montenegrins.

7. *Bohemia—Moravia—Austrian Silesia—The German and Slav Races in Bohemia and Moravia—The Tsekhs.*

A more satisfactory picture is in some respects presented by those crown-lands of the monarchy, which may, on the whole, be described as the North Slavonic provinces; and more particularly in the prosperous lands of "the Crown of Wenceslaus," comprising the kingdom of Bohemia, the margraviate of Moravia, and the duchy of Silesia.

Bohemia especially may be regarded as the brightest jewel in the imperial crown of Austria. Its extremely fertile soil, mineral wealth, and other natural resources, combined with the industry of its inhabitants, render it the richest province in the monarchy. In its flourishing condition an equally honourable share has been taken by the Germans and the Tsekhs, the two ethnical elements in possession of the land, between whom, however, an unfortunate spirit of rivalry and partisanship has of late years been kindled.

In Bohemia and Moravia are found the most industrious towns in the State. In the former, besides its capital, Prague (including suburbs, 218,000), on the noble river Moldau, one of the finest inland cities in Europe, are the busy manufacturing towns of Reichenberg (28,000), Rumburg, Gablonz, Braunau, and others. Weaving of every sort is the principal branch of industry in North Bohemia, where the Teutonic element prevails, while glass-making flourishes in the Böhmerwald, and beet-root sugar and brewing in the central basin, which is occupied mainly by the Tsekhs. Mining operations are also extensively carried on both in the German and Tsekh districts. Karlsbad, Marienbad, and Franzensbad

enjoy a world-wide reputation on account of their medicinal waters.

In the favoured province of Moravia, Brünn, its

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capital, with a population of 83,000, is the centre of the woollen trade; while the neighbouring province of Silesia, with Troppau (25,000) and Teschen (13,000),

capitals respectively of its two departments, is equally famous for its linen goods.

The Tsekhs of Bohemia, occupying the most advanced outposts of the Slav world towards the north-west, betray the effect of Teutonic influences in their manners, social habits, institutions, dress, and in many other respects. But only the superficial observer will venture to assert that they have ceased to be Slavs in everything except their speech. Whoever has travelled in Bohemia is aware of the profound difference between a German and a Tsekh village. It may be added that not so many years ago much in Bohemia was German which has since become Slav, that German was everywhere understood, and that Prague might have passed for a German town. But all this has been changed in an incredibly short space of time. The market people soon ceased to understand German, and in the country districts not a word of that language was to be heard. On crossing the Saxon or Bavarian frontier we now come at once on the Slavonic flood, that has irresistibly covered the whole land of Bohemia. The German element has taken refuge in some solitary asylums, and has become an alien, almost an intruder, in the land.

The explanation of this phenomenon lies in the fact that Austria itself is no longer such a Germanic power as it claimed to be some few years ago. It had been artificially so constituted, and the outburst of national feeling in various districts was but a natural process hitherto kept in undue subjection. So true is this, that nothing in Bohemia has of late years really become Tsekh, that had not at one time been Tsekh; and the rapid spread of this movement is the most convincing refutation of the assertion that the Tsekhs had lost everything except their Slavonic speech.

The Moravian Slavs, at one time the sole inhabitants

of Moravia, are also Tsekhs, or closely akin to them, and still make up nearly three-fourths of the population.

The Tsekhs in general have some excellent characteristics. They are exceedingly industrious, and as craftsmen are held, jointly with the Italians, in the highest esteem. Of all the Slavs they are the most advanced, and, with the Russians, the most highly endowed by nature. According to Dr. Weisbach's measurements of all the Austrian races, they have the largest craniums and the greatest weight of brain. The Tsekh regiments are amongst the bravest in the Austrian service; many of the high government officials are Tsekhs; and the musical talents of this people are universally recognised.

8. *Galicia—Cracow—Bukowina—The Jews, Poles, and Ruthenians.*

In the north-eastern Cis-Leithan States the chief occupation of the people is agriculture. Few industries have been developed, though, as stated in the previous portion of the work, the mineral wealth (salt and petroleum) is considerable. Architecturally speaking, two cities only deserve mention—Lemberg, in the east, with a population of 110,000, and Cracow (including suburbs, 78,000), where the Polish kings were formerly crowned. All the other places, however important some of them may be commercially, present the appearance rather of villages than towns. In the duchy of Bukowina the only place of any importance is the capital, Czernowitz, with 46,000 inhabitants and a university founded in 1875.

Of the predominant Slavonic population there are here two branches, about equally numerous—the Poles in the west, the region of the Vistula, and the Ruthenians in the east. The former speak Polish and are Roman

Catholics, while the latter speak the so-called Little-Russian, and belong to the Greek or Orthodox Church. A real plague to the country are the numerous Jews, occupying in many towns separate quarters, and in some places in a numerical majority, as in Brody, where they constitute 60 per cent of the inhabitants. In Galicia and Bukowina they are more numerous than in any other of the Austrian crown-lands. At the census of 1880 they amounted to somewhat more than 755,000, or upwards of 11½ per cent of the entire population. Most of them speak, or at least understand, German, and stand on a higher intellectual level than their neighbours. In their hands is all the trade of the country; and these "civilisers of the East" thoroughly fleece the peasantry and landed proprietors with equal impartiality.

The increase in the number of Jews throughout the Austrian dominions during the last thirty years or more has been very remarkable. In the Cis-Leithan provinces alone it has amounted during each of the last three census periods to at least 22 per cent of the number at the previous census, while that of the non-Jewish element has never exceeded 10·2 per cent. In the Alpine and maritime crown-lands the Jews are only sparsely distributed over the land, but in all those with a Slavonic population they are congregated in all the large towns in considerable numbers.

Like the Swedes, the Poles have with some justice been compared with the French, for they occupy amongst the Slavonic nations a position similar to that taken by the French amongst the Romance peoples. Like them, quick and vivacious, inspired by an enthusiastic love of their country, looking on bravery, independence, and freedom as the greatest of blessings, they combine with these noble qualities the same national impulsiveness that distinguishes the French, and that has been so disastrous

to both. In other respects the intellectual condition of the Galician Poles stands on a very low level.

The Galician Ruthenians belong to the widely-diffused and expansive Little-Russian stock. In the west of Galicia they are encroaching upon the Polish element, just as they are on the Roumanian in Bukowina, and on the Magyar in Hungary. The name of "Ruthenian" is most unsuitable, as this race belongs undoubtedly to the same linguistic branch as the Great Russians themselves. These Little Russians everywhere call themselves "Rusy," and their country "Zemlya rus" (Russian land).

The Ruthenians are a strong and hardy race, vigorous, healthy, and well-built, and are animated by an intense love of freedom and a marked feeling of self-respect. They are essentially a democratic people, amongst whom there exists no aristocratic class.

Bukowina is ethnically remarkable, even in the East, for the extraordinary diversity and heterogeneous character of its population. Here we have eight distinct nationalities,—Ruthenians, Roumanians, Germans, Poles, Magyars, Jews, Armenians, and Tsekhs; and eight different confessions,—the United and Orthodox Greeks, the Roman Catholics, Jews, Lutherans, Calvinists, Catholic and Disunited Armenians. But the Roumanians and Ruthenians constitute the main element of the population.

9. *The Hungarian Crown Lands—People—The German Element—The Slavonic Element: Ruthenians and Slovaks—The Roumanian Element—The Magyars and Hungarian Jews.*

Turning to the Hungarian or eastern division of the monarchy, we find it occupied by about fifteen and three-quarter millions of people, of whom more than a third are Magyars, an Uralo-Altaic race related more immedi-

ately to the Finns, and more remotely to the Turks and Tatars. The next most numerous element is that of the Moldo-Walachians or Roumanians, after which come the Serbo-Croatians, the Tsekhs, Germans, Jews, Ruthenians, Slovenians, besides Gipsies, Bulgarians, and others. The ruling race of the Magyars have of course a direct interest in representing themselves as being as numerous as possible, but it is beyond all doubt that in the Austro-Hungarian monarchy the Slavs are three times as numerous as the Magyars. It also appears that the Magyars increase less rapidly than either the Slavs or the Jews, and that consequently they cannot in the long run hold their ground against these rival elements, or even against the Roumanians. About half of the Magyars are Roman Catholics, the rest Protestants, mostly Calvinists, with a few Lutherans and Unitarians.

The fate of the Magyars is also shared by the Germans of Hungary and Transylvania, where they fall short of the mean ratio of increase. In the whole of Hungary there is scarcely a single town which is not at least partly inhabited by Germans, while in the interior they are not so much thinly scattered as widely spread over the land. In Slavonia, Croatia, and the former Military Frontier, they are considerably more numerous than the Magyars, but are everywhere more dense in the towns, some of which, such as Temesvar, are essentially German. In their hands are the greater part of the trade and industries, science, letters, the press, and the theatrical world. About two-thirds of the inhabitants of Pest, capital of Hungary, and the whole of the opposite town of Ofen or Buda, and of Pressburg, are Germans.

But, however important this element may be historically and socially, it is of far less consequence politically than the Slavonic, for both morally and numerically it is everywhere on the decline, at least in Upper Hungary.

Many of the former flourishing German towns there have now been reduced to wretched villages, and the people have either been dispersed or reduced to poverty, or else become absorbed by the Magyars and Slovaks, and in some instances even by the Ruthenians.

This result has been brought about partly by many outward circumstances, but partly also by the inherent weakness of the German character, and the readiness with which it lays aside its own and adopts alien nationalities. The tendency to become Slavonised has hitherto proceeded unchecked. To accommodate their Slovak maid-servant both master and mistress will take to speaking Slovakian, and in this way the children learn first to speak this language, so that it now often happens that even in pure German families the current speech is Slavonic. Unfortunately, with their language these Germans also sacrifice the social virtues of their race. Those that have been absorbed by the Slovaks and Ruthenians abandon themselves to the vices of intemperance, uncleanliness, and indolence.

The very opposite is the case with the Germans of South Hungary, where the non-German element is constantly losing ground in the presence of the Teutons. But in the number of these Germans of South Hungary must not be included the 220,000 Germans, or Saxons as they are called, of Transylvania. These last, so far from increasing, are actually on the decline. With all their antiquated mediæval privileges, they are, so to say, being stifled by their very opulence, and are slowly yielding to a ceaseless process of corruption. Here, as has been so often elsewhere witnessed, "wealth accumulates, and man decays."

It is otherwise with the Slavs, who exist in the greatest variety in Hungary. Those of the south, consisting of Croatians, who are mostly United Greeks, and

Serbs, mainly Orthodox Greeks, are entirely distinct from the northern Slavs in the Western Carpathians and the east. In the west almost every mountain range harbours a different race, such as the Goralians of the Tatra, akin to the Tsekhs of the neighbouring Moravian frontier, while in the east the Slav family is represented exclusively by Ruthenians, though these are in many respects different from their Galician brethren.

The Hungarian Ruthenians belong to three different creeds, some being Orthodox Greeks, others United Greeks, and others again "Schismatics." In the German and Slav districts also, both in the Eastern and Western Carpathians, there are many towns and communities in which the races have become so intermingled that it is no longer possible to detect any fundamental element, unless it be sought in the Jewish race, which is most numerously represented in these townships. Here the current language of intercourse is always a corrupt German.

The Slovak districts in North Hungary, which are mostly Roman Catholic, are described as the poorest in the whole country. On the other hand, the Ruthenian districts, under the same parallel, are highly favoured with the vine and fruits of all sorts.

Next to the Slavs the Roumanians are, ethnically speaking, the most dangerous enemies of the Magyars, and above all in Transylvania, where they have already displaced the Magyars, as they have also in the neighbouring districts of Hungary. Between the years 1770 and 1850 the Magyars increased 112·15 per cent in Transylvania, the Roumanians 123·12, and the Germans only 45 per cent. The Roumanians belong partly to the United and partly to the Orthodox Greek Church.

In the midst of this endless confusion of national types and temperaments the genuine Hungarian, the "true blue" Magyar, stands out conspicuously. In him

all the ruling passions and virtues of all the races of the land seem to blend together harmoniously. In Hungary no more upright peasant can be found than the Magyar. All traders, merchants, dealers, craftsmen of every sort, prefer to do business with the Magyar. The German peasant will cheat and impose upon you ten times over in as many minutes; the Slovak will make you ten promises, and break them all; the Roumanian will wheedle you out of anything with fair and flattering words; the Serb with a suspicious show of plain dealing. The Magyar neither lies nor deceives you. But, on the other hand, the Magyar is foremost in all deeds of violence, especially where there is a chance of laying hands on his neighbour's goods and chattels. In Hungary there is no more outspoken friend and abettor of lawlessness than your honourable Magyar peasant. He will cultivate his plot during the day, and in the evening fling himself into the saddle, or else crouch with his fellows in their basket-waggon, and thus go forth, arms in hand, to play the highwayman. Wrapt in his Oriental fatalism the Magyar will calmly smoke his chibook beneath the very gallows: while the German robber becomes a sneaking craven, or else assumes an air of religious mysticism; the Walachian abandons himself to paroxysms of despair; the Serb trolls a national lay.

The intense savagery of the people is due mainly to the want of all instruction, and this again finds its explanation in the physical conditions of the land. The position of the Hungarian townships prevents a regular school system from being carried out, even were the parents anxious to have their children instructed. In the Hungarian plains nature loses all her charms, and here the "tanyas" or dwellings are naturally scattered thinly over the boundless wastes. On the other hand, the market towns are of large size, ranging from 20,000 to

70,000, so that the two or three wretched schools of the place are unable to accommodate half the children bound to attend them, even if they were not prevented from doing so by the mud, often knee-deep in the roads. The staff of teachers is also of the very worst description, many of them being even unable to write.

This state of things accounts also for the absence of industries, and for the primitive way in which field operations are still carried on. The Magyar peasant, instead of thrashing his corn, employs his horse to tread it out, whereby much is left in the stalk, and much more trampled into the ground. Since the emancipation of the Jews, however, the trades have begun to develop, and in time the inexhaustible natural resources of the land will doubtless be opened up. In all this the Jews are the alpha and omega. Their numbers, their spirit of clanship, their skill, and above all their capital, give them a paramount position, while they increase so rapidly that the Carpathian circles are almost filled with them. Between 1785 and 1880 they have increased more than eightfold (from 75,000 to 625,000), amounting at the latter date to rather more than $4\frac{1}{2}$ per cent of the entire population of Hungary and Transylvania. Since its connection with Ofen (Buda) and Old Ofen, Pest enjoys the honour of being the most Jewish city in Europe. By their usury as money-lenders they are doubtless ruining the Magyar nobles and the drink-loving Magyar peasantry; but on the other hand they are almost the sole promoters of trade, introducing commercial dealings into the most inaccessible and neglected districts of the country. They are also the pioneers of culture and the centre of social life, though, except in a few of the large towns, the latter can scarcely be said to exist.

The Magyar in his daily rounds mostly satisfies himself with taking a vigorous part in pothouse politics.

Here he shines with great brilliancy, losing no opportunity to indulge in glowing speeches on the current events of the day. These long-winded discourses are rehearsed at dinners, and on all public occasions, with an earnestness and a fervour which might prove of great service to themselves and their country if directed towards the improvement of the national schools, the paving and drainage of the streets, or such like practical purposes. And in the midst of all this frothing, at the sudden strains of some spirited patriotic tune struck up by a strolling gipsy on his "Cremona," the matter in hand is immediately forgotten; politics, the imminent dangers pending over the State, scientific, literary, or commercial questions —all are thrown overboard, and sedate senator, wise statesman, and grave diplomatist join tumultuously in the mazy dance, which seems all at once to spring up like the clouds of dust sometimes seen whirling before a sudden gust of wind. At the last notes of the fiddle the enthusiastic Magyar plunges his hand into his pocket, and without stopping to count the cost, presents the lucky minstrel with all he had to support wife and family on for perhaps the next month to come. The gipsy, in his turn, who, after all, does not represent the worst social element in the Magyar world, squanders this lavish wealth in even less time than it has taken him to earn it. Yet he may perhaps occasionally be found in possession of the grand house of the Magyar spendthrift, who never stops in his headlong career until warned by want and hunger that he is a beggar. Thus the light-hearted Magyar passes as suddenly from the investigation of the deepest social problems to the wildest frenzy of sensuous enjoyment, as he often does from a state of princely affluence to the most abject poverty.

10. *Chief Towns: Budapest, Pressburg, Szegedin, etc.*

The only noteworthy city in Hungary is the capital, now consisting of the united towns of Buda, or Ofen, and Pest on the Danube. The Hungarian metropolis, with its 360,000 inhabitants, is really a brilliant city, overflowing with all the refinements of civilised life. As we stroll along its magnificent thoroughfares, its spacious quays and handsome suspension bridge, we little suspect that we are in a genuine oasis in the midst of an interminable waste. For Budapest is in the strictest sense the *Urbs*, the one "city" of the country. Of the provincial towns, such as they are, the most important are Pressburg (48,000), above Pest, on the Danube; Szegedin (74,000), on the Theiss, at the confluence of the Maros; Maria-Theresienstadt, in Hungarian Szabadka (61,000), in the plain between the Danube and the Theiss; Debreczin (51,000), in a similar plain on the left of the Theiss; Agram (20,000 inhabitants), capital of Croatia and Slavonia; the free port of Fiume (21,000 inhabitants), the principal commercial and industrial centre on the Croatian coast; and in Transylvania, Klausenburg (30,000 inhabitants), Maros-Vásárhely (13,000 inhabitants), Hermannstadt (19,000 inhabitants), and Kronstadt (30,000 inhabitants).

CHAPTER VII.

THE RUSSIAN EMPIRE.

1. *Extent—Government.*

THE whole of Eastern Europe is comprised within the limits of the Russian Empire, which is not only the largest state in Europe, but ranks next after the British Empire among the states of the world; for, besides its European territory, it embraces the whole of Northern Asia, a great portion of Central Asia, and the region of the Caucasus. When we leave Wirballen, the Russo-Prussian frontier-station, we do so with the cheerful consciousness that we are henceforth at liberty to proceed eastwards for something like ninety-five degrees of longitude without having again to pass through the ordeals of a border custom-house, until we fall, perhaps, into the hands of some yellow-skinned Mongolian officials on the frontiers of the Celestial Empire.

In the present chapter our remarks must be restricted to European Russia alone, which forms the most important portion of this colossal state. The head of this vast Empire, the Czar, as he is here called, is an absolute monarch, still unshackled by any legislative or other constitutional factors. He is at once the temporal and spiritual head of the State, to whom are subject both the Privy Council and the Imperial Council, consisting of the members of the imperial family—that is, the grand-dukes, the heads of the army and navy, the senate, and the holy

synod or assembly of the highest ecclesiastical functionaries.

For administrative purposes European Russia is divided into a number of "governments," and these again are subdivided into circles. Exclusive of the Caucasus —though this province is regarded by the Russians as in Europe—there are 68 governments altogether, differing greatly in size, and named mostly after their chief towns. Several of these governments are often grouped together on historic or ethnical grounds under one name. Of such groups the most extensive is Great Russia, comprising no less than nineteen governments in the heart of the state, and including the whole of the north except Finland, while stretching southwards almost to the Southern Steppes. In this latter region of the Dnieper lies Little Russia or Ukrania, embracing four governments, and bounded on the north-west by West Russia, with eight governments, three of which form the so-called province of White Russia.

Since 1868 Poland has been completely incorporated with the Russian Empire, and divided into ten governments. The four governments of Kourland, Livonia, Esthonia, and Ingermannland or St. Petersburg, are comprised under the general name of the Baltic Provinces, and of these the three first, often wrongly spoken of as Teutonic domain, enjoy certain exceptional political privileges. A far greater degree of local independence is possessed by the eight Finnish governments, or laens, as they are here called, for Finland boasts of a distinct system of administration, with popular representation presided over by a representative of the Emperor. In fact it is not a homogeneous member of the Empire, but a thoroughly independent state, with a constitutional and monarchical form of government, its sovereign being the Czar, and its independence being shown in its possession of a special coinage and postage stamps of its own.

In the south-east of Great Russia we meet the former imperial territory of Kazan and Astrakhan, both with five governments, and the latter bordering on New or South Russia, extending along the Black Sea, and also comprising five governments.

2. *Heterogeneous Ethnical Elements—The Great and Little Russians: the Finnic Theory.*

It will be evident from this grouping of the various provinces that the Empire itself is not inhabited by a homogeneous race, and in this respect no state in the whole world is occupied by a greater variety of nationalities than Russia, embracing as it does within its limits upwards of a hundred different peoples, speaking as many as forty distinct languages. At the same time, with all this diversity, the Slavs, and more particularly the Great Russians, form numerically the great majority of the people, on which account Russia itself enjoys a far higher degree of ethnical unity than either Austria or Turkey. To this must be added the important fact that by far the larger portion of the 85,000,000 of inhabitants in European Russia, out of a total of 98,000,000 in the whole Empire, belong to the Greek or Orthodox Church. Language, religion, and social habits thus tend to unite the Russian people in one mighty nation, the great bulk of whom speak substantially one tongue, with such dialectic divergence as is represented by the Great, White, and Little Russian branches. But in any case there remain some 40,000,000 of Great Russians, possessing such a marked uniformity of national type as but few other nations can pretend to.

Of the diverse foreign elements interspersed amongst the Slavs, the Finnic predominates amongst the Great, the Letto-Lithuanian amongst the White, and the Tatar

amongst the Little Russians, though the last-named are, on the whole, of pure Slavonic blood.

The estimates as to the total number of the Russian Slavs vary very greatly. According to Buschen, they number upwards of 58,000,000, and of these 66 per cent are Great Russians, 27 per cent Little Russians, and 7 per cent White Russians. On the ground of the admixture of foreign ethnical elements with them, some writers have regarded the Great Russians as fundamentally a Finnic, Mongolian, or "Turanian;"—in a word, a non-Aryan Slavonised people, without any right to the name of "Russians." This theory, although, as might be expected, eagerly adopted by Polish writers, has already been fully refuted by the Ruthenian savant Professor Kostomarof, who clearly shows that the Great and Little Russians, with all their historical and ethnographical differences, are substantially two branches of one and the same stock. Professor Ralston[1] also has not only confirmed the claim of the Russians to be regarded as a genuine Aryan race, but further shows that they have preserved the common inheritance of primitive Aryan legends and traditions better than most other members of the family.

Between the Great and Little Russian idioms the difference is not great. The former is spoken by the Great Russians proper, the Don and other Kossacks of Great Russian descent, as well as by the West Russians in the former Polish provinces. The latter is the speech, not only of all the Little Russians proper, but also of the Podolians, Polish Ukranians, Kossacks of the Black Sea, besides all other Kossacks of Little Russian origin. All the Kossacks[2] without exception are true and genuine

[1] *Russian Folk Tales.* By W. R. S. Ralston: London, 1873.

[2] See Fr. V. Stein, *Die Russischen Kosakenheere: Ergänzungsheft*, 71, to Petermann's *Mittheilungen:* Gotha, 1882.

Russians in descent, speech, religion, and customs, and all Russians are essentially one in speech; the two main branches, that is, Great and Little, differing far less, one from the other, than do the High and Low German tongues. This great uniformity is due mainly to the uniformity and open aspect of the land itself, where everything,—man and beast, soil and vegetation, wind and weather,—bear one and the same uniform stamp.

3. *National Types—The Musjik—The Russian "Gentleman."*

Of these the Great Russians occupy the most prominent position. Amongst them a leading type is that of the Musjik, a friendly, harmless creature, absolutely free of all "book-learning," superstitious, and thoroughly loyal. For generation after generation of his forefathers the Church formed a bulwark against all foreign invasions and a refuge in time of need. Hence he fosters for his religion a feeling of love and thankfulness such as probably no other people entertain for theirs. On the other hand, the heathendom that still universally prevailed a thousand years ago has left influences behind it by which his belief has been profoundly modified, often rendering it well-nigh impossible to draw the line between the old paganism and the modern Christianity. It is at times equally difficult to distinguish between the good and bad qualities in the character of the Musjik himself; to determine, for instance, where his patient endurance becomes stolid stubbornness, where his genial joviality degenerates to disgusting debauchery. Throughout life he retains certain childlike and even childish features. Delighted and distracted by every trifle, seldom showing himself capable of earnest thought, he moves in a narrow groove on to the grave, never perhaps stimulated by any elevated sentiment,

never troubling himself about personal dignity or freedom. If he is to be happy he must be ruled with a friendly but firm hand, seldom feeling quite at ease when released from the restraint of the leading strings. Such are the more prominent characteristics of the Musjik in town and country, except that the influence of town life has mostly a deleterious effect upon him. Being naturally inclined to intemperance, and with somewhat cloudy notions on the rights of property, these evil traits are, as might be expected, much more highly developed in large cities than in the rural districts. Yet he seldom sinks quite so low as the criminal element in more civilised lands; and he at least lacks the refinements of vice.

RUSSIAN PEASANT.

The educated Russian is described by Otto Wahl[1] as highly intelligent, and endowed with great powers of perception and adaptibility, though still wayward, even where his own interests are concerned, soon relaxing in his efforts, and inclined to spendthrift ways. He sacrifices everything for the moment, never thinking a passing whim or impulse too dearly purchased. Alternately forbearing and arrogant, jealous, irresolute, and hesitating, or else energetic and persistent, he presents altogether a strange union of contrasts. At the same time the profoundly modified relations brought about by the abolition of serfdom may also possibly rescue the upper classes

[1] *The Land of the Czar:* London, 1875.

from their apathy, and stimulate their natural impulsiveness to earnest work, and thereupon depends to a large extent the future of Russia.

4. *The White Russians, Poles, and Serbs—The Letto-Lithuanians—The Germans in Russia.*

The White Russians present a somewhat gloomier picture. Poverty-stricken, and but little familiar with the comforts and blessings of civilisation, they are at least exceptionally good-natured and inoffensive. They can boast neither of the robust constitutions nor the numerous families and patriarchal customs of the Great Russians. Few, if any, traces of the former Polo-Lithuanian rule can now be detected, the Poles themselves having entirely disappeared from these provinces. More like the Poles are their neighbours and former subjects the Little Russians, the most genial and gifted of all the inhabitants of the Empire. More delicately organised than the Great Russians,—fond of music, song, and flowers, and altogether alive to the beauties of nature,—they supply the romantic element in Russian life, which we should seek for in vain amongst the White Russians.

RUSSIAN PEASANT WOMAN.

Other nations of Slavonic blood in Russia are the Poles, Serbs, and Bulgarians, besides a few thousand Tsekhs settled mostly in Caucasia. The Poles are the

next most important people in the Empire, numbering altogether about 5,000,000, though here again the estimates vary considerably. About four-fifths of these inhabit the ten governments of Poland proper.

The intelligent, industrious, and also warlike Serbs number scarcely more than 8000, residing in the southern border lands. On the other hand, there are nearly 100,000 Bulgarians, who have founded large colonies in Bessarabia, Taurida, and Kherson.

Some very interesting peoples are found in the Baltic provinces, where the Letto-Lithuanian and Finnic or Chudic elements come in contact. The Letts and Lithuanians, the southern neighbours of the great mass of the Finnic populations, form at present the main stock of the inhabitants of Livonia, Kourland, the government of Kovno, the north-western portion of Vilna, and the north of Augustovo, as far south as Grodno. The Lithuanians are mostly Roman Catholics, and are mainly occupied with agriculture, and to a small extent with cattle-breeding.

The Letts are a kindly but somewhat heavy race, though not deficient in capacity for improvement. With the exception of 50,000 members of the Orthodox Greek Church they are Lutherans, and so far instructed that all can at least read, and most of them write also. Yet many superstitions are still current amongst them.

The resemblance in their character and national usages shows that the Letto-Lithuanians are akin to the Slavs. Many ethnologists even suppose that the Lithuanian stock was not originally distinct from the Slavonic, and only subsequently diverged through the admixture of Gothic and Chudic elements, and philological research would seem to point in the same direction. Some recent philologists, in fact—such as Max Müller[1] and Friedrich Müller—group the two together in their linguistic schemes.

[1] *Science of Language*, i. 411: London, 1864.

Lettic and Lithuanian belong of course to the same group, and Schleicher, who some twenty years ago stated that Lettic stood in the same relation to Lithuanian that Italian does to Latin, would now perhaps admit of even a closer affinity between them. Grewingk treats Lettic as a younger sister of Lithuanian, and in any case the resemblance of both to Slavonic can no longer be called in question.

In the Letto-Lithuanian domain, the "German" Baltic provinces as they are often misnamed, there are certainly here and there some scattered and isolated German communities, foremost amongst which are those of Riga, Windau, Libau, and Dünaburg. The German language reaches even into the Finnic domain, being current in Dorpat, Revel, and along a small portion of the Esthonian coast. But these Baltic Germans, though increasing in relative number, do not yet amount to one-fifth of the entire population in Esthonia, Livonia, and Kourland. German is spoken by the nobility and townsfolk, Lettish or Esthonian by the peasantry.

While showing a certain aptitude for improvement, the Letts still keep aloof both from the Germans and the Esthonians, differing even in their dress from the latter, and displaying more cleanliness, order, and comfort in their dwellings than the peasantry of East and West Prussia, who, though now Germanised, were originally closely related to them. The Letts agree with the Finnic Esthonians only in their common hatred of their German masters, and there are Lettish districts where the word "Vahzesh" (German) is still a direct term of reproach.

It may here be mentioned that besides those of the Baltic provinces there are numerous other German colonies in Russia, especially in the south, and even in the Crimea and Caucasia. These settlers still preserve both their Teutonic speech and even the dress in vogue at the time

when they migrated thither. The towns founded by them are generally named after those in the home country—Worms, Speyer, Landau, Heidelberg, etc., and their total number has been estimated at about 800,000. In religion they show a partiality for certain peculiar, but fortunately harmless, sects, the best known of which are that of the peaceable Mennonites, an Anabaptist community possessing many adherents amongst the German colonists of South Russia, and the Moravian settlement of Sarepta on the Volga, in the government of Saratof.

5. *The Swedes of Finland—Finland and the Finns.*

Another branch of the Teutonic family represented in Russia are the Swedes, dwelling in a compact mass especially along the south coast of Finland. Here they number between 200,000 and 300,000, and are occupied mainly with agriculture and navigation. The Swedes are exclusively Protestants, and form the ruling class in the principality of Finland, which might therefore be called "Swedish" with as much right as the Baltic provinces have been called "German." Swedish is even the official language in Finland, and the proceedings of the Finnish diet in Helsingfors, capital of the principality, are conducted in the same language. At the same time the great bulk of the population are Finns, numbering about 1,550,000, and mostly belonging to the Lutheran confession.

The commerce of Finland is not inconsiderable. Åbo, the former capital of the country, was the chief seaport and commercial centre in mediæval times, but since its annexation to Russia its trade has moved farther east to Helsingfors and Vyborg. The only manufacturing town of any note is Tammerfors, a little place which the Finlanders are fond of calling "the Finnish Manchester."

Here are some important cotton-spinning factories, paper and machinery works, and the place is now connected by rail with Vyborg and St. Petersburg.

The exports consist mainly of timber, planks, and tar, and so considerable is the commercial movement that, notwithstanding the poverty of the interior, a certain prosperity prevails along the seaboard. Finland, which has a coinage of its own, has adopted the French decimal system, the mark corresponding to the franc, and like it being divided into 100 units (*penniä*, or pennies).

There can be no doubt that in former times the Finnic race was spread much farther south than at present, and that it has been driven into the inhospitable region now occupied by it in the northern extremity of the continent solely, or at all events mainly, through the continuous pressure of the Teutonic and Slavonic peoples. But this displacement of the Finns by the Letts and others naturally took place very gradually. Even so recently as the time of the first appearance of the Germans, the inhabitants of Livonia were a powerful and warlike Finnish people, and not Letts, as they now mostly are.

Most of the Finns, originally nomad fishing or hunting tribes, have long since risen in the social scale above this savage state, through the influence of more civilised races adopting a settled pastoral or agricultural life. The Ostyaks and Lapps alone have been compelled by climatic conditions to continue their nomad life, supporting themselves mainly on the reindeer, and partly also by fishing. Some of these tribes have had the advantage of embracing Christianity, and with it the civilisation of the West.

The Finns themselves have lived so long in contact with other races that they also often show a very mixed character. During the period of racial migrations they became mingled with Turkish or Tatar peoples on both

sides of the Ural, whilst others already settled in Europe were subjected to Teutonic and Slavonic influences, and others, again, became intermixed with North Siberian races.

Physically the Finns are, as a rule, strongly built, but of low stature, with almost round head, forehead little developed, low, and arched, flat features, prominent cheek-bones, as amongst the Mongolian race generally; eyes mostly gray and oblique, the outer corner pointing upwards; short and flat nose, protruding mouth, thick lips, neck very thickset, so that the back of the head appears flat and almost in a straight line with the nape of the neck. The beard is weak and straggling, but the hair is not exclusively black, being also brown, red, and fair, while the complexion is brownish.

With honesty, hospitality, trustworthiness, and perseverance, together with a certain sense of personal freedom and independence, they combine the vices of obstinacy, revenge, and cruelty. They are also indolent, disobliging, and of uncleanly habits.

6. *The Kalmucks, Tatars, Samoyedes, and other Races.*

Amongst the peoples of Mongolian race settled in Russia are the Kalmucks, about 100,000 strong in the governments of Astrakhan, Stavropol, and the steppes of the Don Kossacks. Another branch of the Kalmucks lives in the Siberian governments of Tomsk and Yeniseisk. The Kalmucks are nomad tribes, professing Buddhism, and seldom adopting the Christian religion. They are, on the whole, an intelligent race, capable of rising in the scale of social culture, though all science, learning, and even the healing art, have hitherto remained the exclusive monopoly of their Buddhist priests.

In the vicinity of Kazan, on the Volga, there are some

Mohammedan Tatar settlements,—the home of a temperate, honest people, anxious to improve their social status. Most of them can read, write, and count, in consequence of which the young men are in favour with the merchants and tradespeople. In the Crimea also the Tatar element is numerous and prominent enough to impart

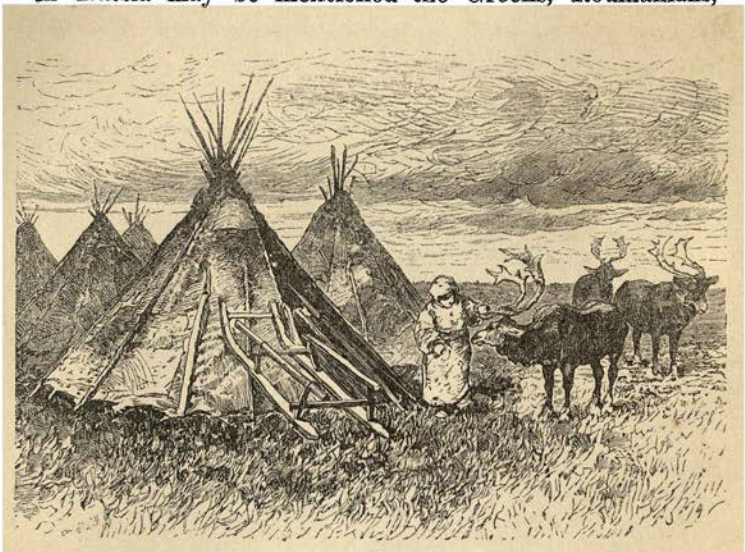
KALMUCKS.

a decidedly Oriental aspect to the whole country. The Tatars of the coast are a tall, handsome, intelligent-looking people, and their old capital, Bakchiserai, is a purely Oriental city; in race, religion, and national customs thoroughly Tatar.

There is not much to be said in favour of the Samoyedes, also a branch of the Great Uralo-Altaic family, who lead a nomad life, roaming over the toundras

of Northern Siberia in a state little, if at all, removed from absolute barbarism. Although a few of them belong nominally to the Greek Church the majority are still pagans, worshipping rudely-carved figures of deities, and still showing a strong tendency towards fetishism.[1]

Amongst the other less prominent ethnical elements in Russia may be mentioned the Greeks, Roumanians,



SAMOYEDE HUTS.

Armenians, and Gipsies; lastly, the Jews, that veritable pest of all Slavonic lands, conspicuous amongst whom in Russia are the Karaim Jews.

7. *Culture and Social Life of the Russians.*

In the foregoing remarks it was impossible to do

[1] Edward Rae, *The Land of the North Wind; or Travels among the Laplanders and Samoyedes:* London, 1875.

RUSSIAN PEASANT HOUSES. *To face page* 417.

more than refer in a general way to the leading ethnical elements of East Europe, a region which is alone nearly as extensive as all the rest of the continent. Nor will our available space allow us to do more than touch upon some of the main features in the social and moral aspect of Russia. Characteristic in this respect is the striking contrast which immediately presents itself on crossing the western frontiers of the Empire. When passing elsewhere from one country to another we meet with gradual transitions in speech, manners, costume, appearance, and structure of the houses. But here language, customs, dress, even the coinage, and a thousand other features, constantly remind us that we are in a strange and foreign land. We are struck especially by the peculiar form and colour of the churches and house-tops, the favourite tones here being a sky-blue, gold, or dark green, and occasionally blue, studded with silver stars. The churches themselves present the aspect of little citadels. With the exception of a few built by Peter the Great on Dutch models, they all assume the cruciform shape, and are otherwise pervaded by a subtle Oriental atmosphere.

The houses of the better classes in the country are nearly always planned after the Swiss style, and also decked with green or blue roofs, and occasionally red, though not tiled, but covered with zinc, painted red.

The peasantry and day-labourers dwell in little cabins with thatch roofs, seldom provided with flues, the smoke mostly making its escape through the doorway. This primitive method is naturally not free from danger of occasional conflagrations, which the insurance companies, supported by the authorities, are endeavouring to obviate by introducing more civilised arrangements. But against all such efforts the Musjik obstinately sets his face, declaring that what was good enough for his fathers must be good enough for himself also.

8. *The Village Commune or Mir.*

Count Cavour once remarked that the Russian village commune system, the "Mir," as it is called, is "destined to go the round of the globe." It has, on the other hand, been condemned by political economists as opposed to the social development and free action of the individual. The term "Mir" means "world," and the system in question forms in truth a little world of its own. But the antiquated idea that it was a peculiar Slavonic institution is now exploded. In the Mir there must be distinguished an administrative and an economical element, the local administration being of a very simple character. The commune generally possesses a solitary official or "starost" (literally "the oldest"), chosen at the communal elections, and administering the affairs of the village with the help of the communal assembly. So far the Mir is an organ of local self-government. But, on the other hand, in its economical arrangement it differs essentially from anything of the kind to be met with in Western Europe. It is legally and *de facto* in possession of all the communal lands, with the absolute power to parcel them out according to traditional rights and usages. At the same time all the members of the commune are personally responsible for the general and individual taxes.

The communal lands consist—1st, of the ground on which the village stands and its immediate environs; 2d, of arable land; and 3d, of grazing grounds. On the first every family receives a wooden house with a court and vegetable garden, often also with a strip of ground on which to raise a crop of hemp. House and garden are heritable property, with the single reservation that they cannot be bequeathed to a member of another commune.

But of the arable and pasture lands the population enjoys the usufruct only in a ratio corresponding to the number of the male inhabitants of the place. As soon as a member of the commune pays the capitation tax and other imposts he also receives his share in the communal lands, so that the assessments are to some extent a land tax, the public charges and the allotments always standing in certain definite relations one to the other, which again necessitates constant repartitions of the land.[1]

But although self-governed, the Mir forms after all a community of bondsmen. Only as a member of the commune has the peasant any standing or means of subsistence in the land. Once expelled from it he becomes a social pariah. At the same time the commune itself exercises the most terrible supervision over its individual members, and within its pale the head of the family and the priest are again practically little tyrants in their way. The knut, though legally abolished, still continues to be vigorously applied in the most patriarchal fashion, and the Musjik submits to the lash with all humility and resignation. This meddlesome supervision penetrates into all the social and domestic relations, in which even the rudest peoples elsewhere enjoy a certain degree of personal freedom. The patriarch, or the priest, and the match-maker arrange the marriages between them, without even consulting the wishes of the parties more immediately concerned.

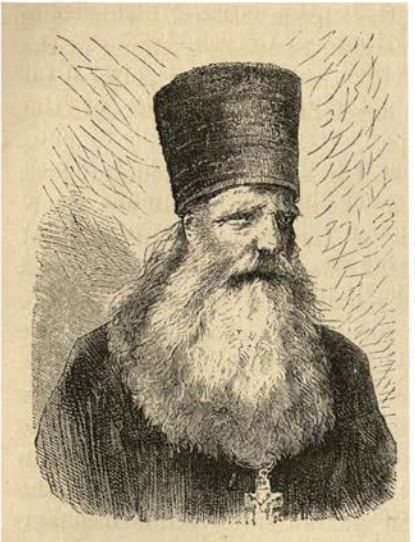
Until the year 1861 the Russian peasantry languished in the bondage of serfdom under the noble owners of the land, who estimated their means according to the number of "souls" on their property. The peasant was unable to shake off the yoke without the sanction of his master, who might either decline to accept a price for, or refuse to grant him, his freedom. There were wealthy mer-

[1] D. Mackenzie Wallace, *Russia*, i. 178-209 : London, 1877.

chants, artists, and writers who still remained serfs, and though this state of things has been abolished, it has been succeeded by another with many dark features of its own.

9. *Religion—The State Church—Dissenters—Education.*

The ruling religion in Russia is the Orthodox Greek Church, at whose head is the Czar with the "Holy Synod." The clergy are divided into the so-called "white," or married secular priesthood, and the "black," or regular order of monks. The former are more intimately associated with the social life of the people, while in the hands of the latter is the supreme control of ecclesiastical affairs. There are at present altogether about 600 monasteries and nunneries of the Greek Church in the Empire. The people themselves are intensely religious, but split up into countless sects, often of the most eccentric character, and the entire southern zone of the State may be said to be occupied by dissenting communities.



RUSSIAN PRIEST.

All these "Schismatics," or *raskolniki*, are divided into the so-called "Staroviertz," or *old believers*, forming a sort of popular church, with numerous adherents especially amongst the northern peasantry and the Don Kossacks,

and the "dissenters" properly so called, of whom there are hundreds of sects. This statement will, of itself, suffice to dispel the illusion that the reveries of these Russian sectaries are inspired by political motives, though it cannot be denied that some of them have manifested political tendencies. Nor amongst the religious sects can be included the "Nihilism" so widely spread even amongst the women of the upper classes. This is a purely atheistic and democratic association aiming at the immediate subversion of all the social and political institutions that have been developed by the most civilised nations of Western Europe.

Public instruction is still in a very low state all over the Empire. The national schools that do exist are generally deficient in the means of imparting instruction, and are not always placed in the most convenient sites; and the consequence is that the number of those who receive no instruction at all is very great. To this picture the sole exception is presented by the Baltic provinces, where compulsory education has been introduced amongst the Lutheran communities since April 25, 1875. These serious defects are frankly admitted and commented on in all official reports, and this candid treatment of the subject is perhaps the best guarantee for future improvement.

10. *St. Petersburg—Moscow.*

Of the Russian cities the two capitals alone call for special mention. Compared with them, all others, even the most populous, of which there is no lack, are little more than mere provincial towns. Even the wealthy and commercial Odessa, with its splendid buildings, presents no features of a special type, such as might perhaps be in some respects claimed for Archangel (20,000), Kief

(127,000), and the somewhat Asiatic towns of Kazan (94,000) and Astrakhan (58,000).

St. Petersburg, with a present population of 875,000, is perhaps the most formal and stately of European capitals. None other is intersected by such a broad stream as the Neva, here nearly a mile wide. The grand features of St. Petersburg culminate in the due proportions observed between the noble quays, streets, and squares, as compared with the size of the river, all conceived on a grand scale, harmonising well with the colossal buildings flanking them. A uniform style of architecture has also been consistently adhered to, while avoiding the sameness produced by monotonous repetitions. Besides the churches and monasteries, specially remarkable are the great markets, which form such a prominent feature in all Russian towns. These *Gostinoi-dvor*, as they are called, are huge, one-storied buildings, including whole lines of shops and warehouses, that on the Nevski-Prospect containing no fewer than 340 of such stores. The public buildings are very numerous, those of the various ministries, the admiralty, and the university exceeding in size all similar structures elsewhere. Some of the theatres also are well worth seeing, while an imposing effect is produced by the numerous palaces of the imperial family, especially the Winter Palace on the Neva. If to these are added the many splendid residences of the nobles, it will be readily understood that St. Petersburg takes a foremost position amongst European capitals for the size and magnificence of its public edifices.

Moscow, with a present population of more than 600,000, and characterised by a decidedly Oriental colouring, is reached by express train from St. Petersburg in fifteen hours. Moscow is the holy city of the Russians, the Rome of the Russo-Greek Church, the city of convents, churches, and chimes. But it is also the seat of wealth,

of the aristocracy, of the merchant classes, and the centre of the interior trade of the country. Previous to the foundation of St. Petersburg by Peter the Great it was the capital of the Empire, and it will ever be memorable

CHURCH OF THE SMOLNOI CONVENT.

in history as marking the turning-point in the hitherto victorious career of Napoleon Bonaparte. With the Kremlin and its surroundings are associated all the memories of its past greatness, and around the Kremlin the present also ever wreathes fresh charms. This is not

so much a single palace or castle as an accumulation of palaces, public offices, ecclesiastical edifices, and open places, crowning the hill of this name, which itself commands the whole city, in the very heart of which it is situated. It is difficult to convey a just idea of the impression produced by a general view of Moscow. Bearing in mind that a Russo-Greek church is usually adorned not merely with one or two towers, but with a large central dome encircled by four smaller domes or towers, all, without exception, covered with metal, gilded or silvered over, or painted in one or many colours,—light-green, blue, or even pink; every dome and pinnacle further surmounted by a large gilt cross attached to the ridge of the roof, with heavy uniform chains in filigree work; we can readily understand that in the bright sunshine there is produced a glitter and a dazzling play of light and colour, giving the traveller from the West a foretaste of the East such as can nowhere else be matched in Europe, except perhaps in Constantinople. The streets of Moscow are always wide, flanked with comparatively low but roomy houses, and often with splendid structures, though the effect is unfortunately much impaired by the absence of all sanitary measures. Altogether, although the old capital is, in many respects, more interesting, and even more wealthy, than the new, it cannot compare in beauty and elegance with the truly imperial city of St. Petersburg.

11. *Natural Resources—Railway and Telegraphic Systems.*

With its enormous internal resources of every sort this mighty Empire is almost entirely independent of the rest of the world. Thus we have in the north a region quite as large as Spain entirely covered with timber. Then comes another tract of equal size whose population

is engaged in every industrial art, relying for its fuel on the first. Farther on is a vast region, twice the size of France, whose moist black soil, an account of which is given in the previous portion of this work (p. 169), has produced the most abundant wheat crops for upwards of a century without ever requiring to be manured.

It is this last portion of the country whose resources are probably of most consequence for the future development of Russia. How important these are already may be inferred from the fact that the provinces covered by this soil, though embracing at the highest estimate less than one-fourth of the total area of Russia, are estimated to contain 53 per cent of the entire population, and to produce 68 per cent of the entire crop of cereals, at the expense of only 59 per cent of the total quantity of seed sown.[1] But it must be remembered that these figures are very far from showing what the soil in this part of Russia is capable of. Though the richness of the soil has made this part of Europe renowned for its fertility since the time of the Romans, so primitive is the mode of agriculture still pursued here that the ground does not produce a tithe of what it might do. The explanation of this backward state of agriculture in a region so highly favoured as regards soil is to be found partly in the physical features of the region and partly in the history of the country. There is no inducement to cultivate the ground carefully when there is no outlet for surplus crops, and such an outlet can be procured only where there are adequate means of communication. Now it has already been pointed out in the physical section of this work that the great rivers of Southern Russia are rather obstacles to intercourse than highways of communication with the outer world. Most of them have their channels obstructed near their mouths in such a way as to hinder

[1] Oscar Peschel, *Europäische Staatenkunde*, p. 145.

navigation. They are, moreover, subject to inundations, and the whole country is apt in wet seasons to be converted into a vast slough, so that the construction of good roads is a difficult matter, and, in fact, such roads are almost entirely absent in Southern Russia. Further, this region was, till comparatively recent times, occupied by untamed nomadic hordes, who rendered the life of settled cultivators of the ground insecure, so that the Russians preferred to migrate in search of new land northwards towards the forest region rather than southwards into the Black Soil, notwithstanding the natural advantages that the latter presented.

Recently, however, all this has been to a large extent altered, and further improvements may be expected to take place in the near future. Communication with the outer world has been provided by means of railways. The nomadic hordes have been subdued. The consequence is that this fertile region is now attracting large numbers of settlers from the less favoured districts farther north. Whole villages sometimes migrate in a body, and that in spite of the efforts of the authorities to prevent this displacement of population.[1] Meanwhile there is such abundance of unoccupied land that this internal migration is not leading to any improvement in the mode of agriculture. Virgin soil does not require high farming, and as long as that is found in plenty it may be expected that the cultivators will prefer to seek new land when the old is exhausted rather than bestow labour and expense on making the old fertile. But it is obvious that as this goes on a time must come when extensive culture, as it is called, will give place to intensive, when high farming must be adopted to maintain the increasing population. Since the introduction of railways all that is wanted to bring

[1] D. Mackenzie Wallace, *Russia*, ii. 416, fgg.

about this result is peace and order and the higher organisation accompanying an advancing civilisation. When these have had their full effect it may confidently be believed that this part of Europe will support an enormously greater population than it does at present, though how large it would be impossible to say. At present, if we take the fourteen governments of Volhynia, Podolia, Bessarabia, Kief, Chernigof, Poltava, Kharkof, Tula, Orel, Voronej, Riazan, Tambof, and Penza, as constituting the best part of the Black Soil region, we find that their total population, according to the most recent estimate, is only 27,350,000; about 100 to the square mile. The almost purely agricultural provinces of Flanders in Belgium have a population of 660 to the square mile, so that even if we take the utmost attainable limit at something considerably less than that, we may still believe that a population of about 150,000,000, or 5½ times the present one, is possibly capable of being supported by the governments above named; and hence we may imagine of what great importance the development of the Black Soil region must be for the future history of Russia.

CHAPTER VIII.

SWEDEN AND NORWAY.

1. *Government and Constitution of the two States.*

THE kingdoms of Sweden and Norway are connected together only by a sort of personal union—that is to say, both crowns are worn by the same prince, and both governments are represented abroad by the same diplomatic corps. In all other respects they form two perfectly distinct states, so that we have a Swedish and a Norwegian army and navy, administration, and so on. Each country possesses its own institutions and laws, and had, till recently, its own mint. But by a special Scandinavian monetary convention Norway, Sweden, and Denmark have now one coinage in common.

In Sweden the king is assisted by a Privy Council and a Parliament with two Chambers. In Norway there is also a Council of State, and the *Storthing*, or Great Council of the Commons, with two branches, the *Lagthing*, or legislative body, and the *Odelsthing*, or assembly of the landed gentry. The Lagthing consists of one-fourth of the members of the Odelsthing, chosen by the Storthing. There is a titled nobility in Sweden, but not in Norway, where, however, the larger landed proprietors practically constitute a sort of aristocracy.

2. *The Character of the Norse Race.*

The usages and institutions of this country, removed as it is from the great stream of national intercourse, are still marked by a certain simplicity, recalling the practices of bygone times. This is also largely due to the peculiar and strongly-marked features of the Scandinavian character.

This brave and hardy race, overflowing with energy, enterprising, proud of and devotedly attached to the fatherland, is indebted for these qualities to the physical conditions of the country, and the occupations thereby imposed upon them. Nurtured by the sea, which he looks on as his second home, the Scandinavian still proudly remembers the Vikings, those daring seafarers who once went forth in small but skilfully-constructed vessels to conquer the world, and over whose grassy mounds may still often be seen monuments covered with Runic inscriptions. The soil itself yields him but a scanty subsistence, and mining and seafaring probably employ a greater proportion of the population than in any other country in the world. Hence his pleasures also are of a very simple description, his homely fare consisting mostly of a sort of biscuit, in times of scarcity mixed with the bark of the birch tree. He lives a somewhat secluded life in his *gaard*, or farmstead, on Sundays alone associating with his few acquaintances on the way to and from the parish church. The *bygdes* also, bearing some remote resemblance to our idea of a village, are very thinly dotted over the land. All these and other circumstances tend to foster a certain healthy and conservative element in the Norseman. He has forgotten none of the memories of the heroic past, nay more, the old Teutonic mythology still survives in familiar lays and sagas. Giants and elfs

are not yet dead, but continue to hold commune with the people.

The Scandinavian is profoundly religious, and his Protestantism is so severe that it recalls the days of the Thirty Years' War. And here the dark side of the picture is an intolerance of other creeds. All creeds are indeed tolerated by the State, but the feeling of the people has hitherto been such as to exclude the Jews altogether, and the Catholics almost entirely, from the country.

The three great branches of the Scandinavian family do not differ materially from each other. The Swede, however, passes for the Frenchman of the North—the man of refined tastes with a delicate appreciation of the pleasures of existence. This is partly due to the country itself, where the soil, especially in the south, is more fertile and the climate less rainy than elsewhere. Of all the Norse dialects Swedish is also the most sonorous, and is peculiarly adapted to poetic expression in all its forms. In Norway Danish is still the language of the upper classes, and it is not long since Norwegian has been employed in literature; yet the gifted Björnstjerna Björnson has composed masterly novels in this dialect, his works affording a deep insight into the national life of the people. The Norwegian is exclusive, and has impressed the spirit of this exclusiveness on the constitution, which practically excludes all except the landed gentry and the government officials from political rights.

Altogether the Scandinavian is honest, conscientious, religious, reserved, brave, and energetic. For the subordinate part he plays in politics he seeks to indemnify himself by the recollection of the past greatness of his heroic forefathers. A people so sound at heart and so industrious need not fear for its future.

3. *State of Education and the Industries in Sweden.*

Public instruction, especially in Sweden, is in a very satisfactory state, and the arrangements in the elementary schools are in many respects models in their way. Very few adults are entirely illiterate.

Of the industries, which have been fairly developed in many places, the most active in Sweden is that of the cabinetmakers. The timber trade has for many years been actively carried on in the southern and central districts of Sweden, the chief centre of this industry being Göteborg. A special branch is the manufacture of matches, the explosive materials of which are partly imported from England. Timber is also largely used in house architecture, turnery and wood-carving forming a prominent feature in the household arrangements all over the country. Wood is further the mainstay of the highly important iron industry in Sweden. Unfortunately the forests in the neighbourhood of the ironworks are nearly exhausted, while on the other hand most of these works are so far removed from the railway lines that disastrous consequences have already resulted. There is very little coal in Sweden, but Swedish iron and steel can compete with those of all other countries, not excepting England. On the cast and wrought iron and steel works is based an excellent manufacture of machines, tools, and arms, which has acquired vast proportions, at least for a country like Sweden.

4. *Aspect of Town and Country in the South of Sweden.*

It follows from its geographical position that Scandinavia is approached mainly from the south, where Malmö is the chief centre of the railway movement, lines radiating

thence through Christianstad and Jönköping to Stockholm, capital of Sweden.

Jönköping, with its long, broad, and straight streets, is a pretty town with from 12,000 to 13,000 inhabitants. It lies between Lakes Munk and Rock on the south, and Lake Wetter on the north; and ships bound for this town do not anchor in the treacherous Lake Wetter, but pass through the canal now connecting it with Lake Munk, where there is an excellent harbour.

The steamer plying between Jönköping and the capital traverses Lake Wetter almost in its entire length, and then carries us through a series of canals and lakes, the last of which is Lake Mälar, a lake dotted all over with islands of every form and size, some surmounted with castles, and others studded with peasants' houses and fishing hamlets.

A three hours' trip through this lovely lake brings the traveller to Stockholm, capital of Sweden, a city of the most striking contrasts, situated on seven islands at the outlet of Lake Mälar into the Baltic. With a population of 170,000, Stockholm is the most beautiful of all northern cities, and for its unique and picturesque situation may well bear comparison with Naples and Constantinople. It has also often been called the Northern Venice, but it is certainly no copy, but rather an original, in many respects superior to its southern rival. If eclipsed by the number and splendour of the palaces adorning the Queen of the Adriatic, it, on the other hand, unites everything that Nature has refused to Venice—hills, crags, and wooded landscapes, while the artificial canals of the Italian city are here represented by natural arms of the sea. From the highest point of Södermalm, the southern suburb of Stockholm, originally a rugged mountain, the view is superb. The island-city lies at our feet, and on our right another island, the Djurgarten (literally *deer-*

garden), formerly a royal deer-park, but now converted into public pleasure-grounds, with numerous restaurants, cafés, and other attractions, rendering it one of the most pleasant places of the kind anywhere to be met with, both in winter and summer.

In Lake Mälar there are some 1300 islands, while its bluffs, headlands, narrows, bays, and creeks are beyond counting. In one place it resembles a concourse of streams ramifying in all directions, in another a majestic inland sea serving as a glittering perspective to the summer retreats of the royal family of Sweden. In its waters are mirrored the towers of Gripsholm, the grand flight of steps leading to Drottningholm and the terraces of Ulriksdal. Gripsholm is a mediæval castle, whose solemn halls, now occupied by long rows of knightly armour, have outlived many a revolution, and whose keep has served as the prison for many a dethroned prince. Drottningholm, on the other hand, is a magnificent building, the favourite residence of the reigning family; while Ulriksdal, nestling in one of the lovely inlets of the lake, is occupied by the art-loving king himself.

North of Stockholm lies the university town of Upsala (16,000), in a somewhat monotonous but fertile district, at a point where Lake Mälar shrinks to the proportions of a river mouth. Though an old name it is but a new place, for the wooden structures of the Swedish towns fall too often a prey to the flames to grow old. The prettily-situated town of Gefle (19,000), the third commercial emporium in Sweden, was almost entirely burnt down in 1869, and has been since then rebuilt. It has two docks, a school of navigation, and does a large trade in wood and iron.

5. *Dalecarlia and its People.*

From Gefle the railway leads westwards by Lake Runn to Falun (7000), capital of the former province of Dalecarlia, which differs not a little both physically and ethnographically from the southern districts of Sweden. The inhabitants of Dalecarlia are a robust race, endowed with much mother-wit and mechanical skill, which displays itself in clock-making, hair-plaiting, etc. The winter they spend mostly at home, and in summer they retail their wares in Sweden, Denmark, and England, or else seek employment, especially in the capital. But as they return yearly to their native valleys they bring more and more foreign usages with them, and thus the simplicity of manners by which Dalecarlia has ever been distinguished is gradually disappearing. There still lingers, however, a national costume, which has long vanished from the southern and central districts. Falun owes its importance mainly to its copper mines, though even these are far from being as productive as they were two or three centuries ago.

Other considerable towns in the south of Sweden are Karlskrona (18,000), situated on some rocky islets in the Baltic, and Göteborg or Gothenburg (76,000), at the entrance to the Kattegat, the second seaport in Sweden. In the island of Gotland, that is, "Goodland," lies Wisby (6000 inhabitants), at one time a leading Hanse town and one of the centres of the Baltic trade.

6. *Social Condition of the Norwegians—Christiania—Bergen.*

Somewhat different are the social relations in the neighbouring kingdom of Norway, a land possessing, on the whole, a less degree of culture than Sweden. The population is at present multiplying too rapidly for the

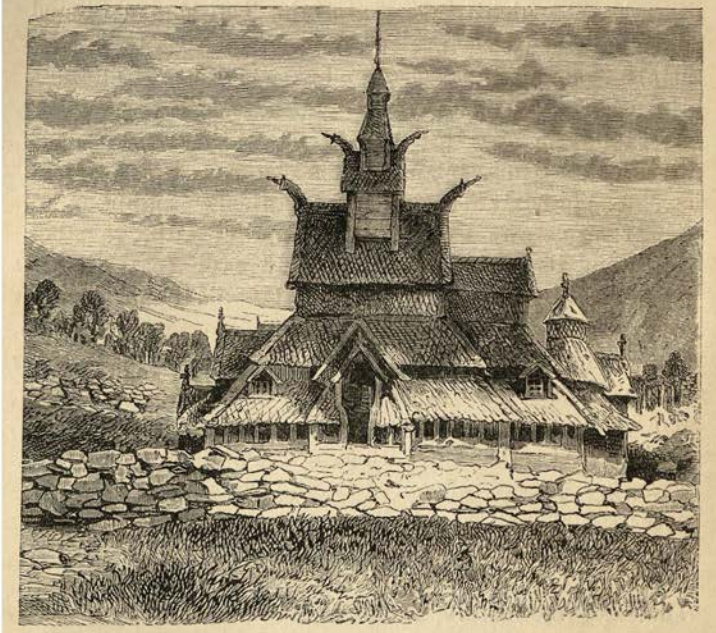
resources of the country, and hence Norway, as is shown by one of the tables under the heading "Vital Statistics" in the STATISTICAL APPENDIX, furnishes a relatively larger number of emigrants than any other country in Europe except Ireland. Amongst the endemics are *Elephantiasis Græcorum* (a sort of leprosy), cancer, and especially consumption, to which 14 per cent of the deaths are attributed. Idiocy also is very prevalent, a fact which is attributable mainly to hereditary causes and excessive use of alcoholic drinks. Since 1840 vigorous efforts have been made to arrest the progress of these evils, both by repressive measures and by temperance societies. These efforts have been fairly successful, and the consumption of brandy sank from 16 litres per head in 1833 to 10 in 1843, and between 1861 and 1865 even to 4, though it has recently again risen. Amongst the upper classes also the use of spirits, at one time so universal, has greatly diminished.

In Norway education is compulsory and gratuitous from the age of eight to confirmation, which is generally administered in the fifteenth year. Public instruction is altogether largely influenced by the Church. Its avowed object is above all to impart a thoroughly Christian education to the youth of the country, so that besides other useful branches of knowledge much attention is devoted to religion, Bible-history, Bible-reading, and psalm-singing.

The Norwegian dwellings are still almost exclusively of wood, and till within some fifty or sixty years stone and brick buildings were amongst the rarest sights. But for many years a law has been in operation restricting the use of wood in the larger cities to houses of a certain limited size, and regulating the distance at which they must stand from the neighbouring buildings.

In the country wood is mostly used for fuel, though peat replaces it in some localities, and coal is frequently

met with in the larger towns. And it may here be remarked that even in this densely-wooded country the cry has already been raised against the reckless destruction of the forests and the consequent scarcity of timber. The people generally bear a good character for cleanliness,



CHURCH AT BORGUND, NORWAY.

though there is still room for improvement in this respect in the fishing places on the west coast, and in some of the poorer villages of the south, while matters are still worse in Lapland and Finmark.

The most important towns in Norway are Christiania, Christiansand, Stavanger, Bergen, Throndhjem, Namsö, Bodö, and Tromsö.

Christiania, though the seat of government, a university town, and a commercial seaport, cannot compare with Stockholm, either for the beauty of its situation, the grandeur and magnificence of its public institutions, or the contents of its museums. This is doubtless partly due to its relatively recent expansion. In the year 1814 it was still a small place of no more than 10,000 inhabitants, while it has at present a population of upwards of 90,000, including suburbs.

Bergen (34,000) was, under the former Danish rule, the capital of Norway, and is still an important seaport, with a population of 30,000. It is in fact the principal trading place in Norway, and one of the centres of the coast fisheries, receiving annually about 600,000 stockfish from the Lofoden islands, and exporting 200,000 tons of train-oil and salt fish. It lies at the head of an inlet of the sea running far inland, has narrow, crooked, uneven streets, mostly wooden houses in the peculiar Norwegian style, six public squares, an exchange, a theatre, and a royal palace.

7. *Travelling and Scenery in the north of Norway—Throndhjem—The Lofoden Isles—Tromsö.*

The country north of Bergen—Sognefjord, Romsdal, Throndhjem and the Arctic regions—does not appear to suffer particularly from wet weather, and July being mostly fine is decidedly the best month for travelling. The northernmost points are all now easily accessible, as there is a weekly steamboat service in summer from Throndhjem along the coast all the way to Vadsö, near the Russian frontier. The steamers, which, of course, run much less frequently in winter, are roomy and comfortable, and stop about every two or three hours at some station.

The western seaboard of Norway is so completely

sheltered by islands, or at least low rocky reefs, that the water is always smooth between Christiansand and Hammerfest, so that the most susceptible are here little liable to sea-sickness. The boat often steams for hours at a time through a sort of strait, and it is on one of these, the so-called "Garden of Norway," that is situated Throndhjem (23,000 inhabitants), the old fortified place where were crowned the kings of Norway. It lies at the mouth of the Nid, flowing into the Throndhjem Fjord, which penetrates far into the land. Throndhjem is one of the most interesting and oldest cities in Norway, forming a handsome semicircle facing seawards, its bright wooden houses rising in terraces one above another, with the venerable cathedral of St. Olaf in the foreground of a green range of hills. Altogether, though there are some important places still farther north, such as Namsö, Bodö, and Tromsö, Throndhjem is the most northerly centre of civilisation in Norway.

Over against Bodö, at the mouth of the Salten Fjord, lie the southernmost of the Lofoden group, forming a naked rocky chain with the boldest and most fantastic outlines. With their jagged indentations they look like the double row of teeth in the shark's mouth, as they rise in clear weather abruptly out of the water at about 60 miles from Bodö. Some of these rocky heights attain an elevation of nearly 5000 feet, and when covered with snow they present a marvellously-beautiful sight. They are somewhat thickly peopled with a hardy race of fishermen, occupied principally in the preparation of the raw materials for cod-liver oil.

At Bodö we are already within the Arctic circle, but even Tromsö, several degrees farther north, is a place of some importance. It stands on a little island, which is separated by a narrow channel from a larger one to the east, sheltering its convenient and much-frequented

harbour from the winds. Here cod and ling are everywhere strewn about, drying in the sun, and behind the town rise hills of birch and pine, with a few pretty country seats, which enjoy a fine view of the opposite islands. But the pride of Tromsö is its cathedral, a very large and handsome cruciform wooden structure, still retaining its first fresh tones. The interior, which is scrupulously clean, has a fine organ and some beautiful wood-carving

8. *Lapland and the Lapps.*

At Tromsö civilisation comes in contact with the first traces of savage life. In its neighbourhood dwell a number of Laplanders, who, although the missionaries have done wonders in the way of educating them, still continue to occupy a low scale in social culture. Their faculties seem to be of a restricted order, and they form a race apart, like the Gipsies elsewhere in Europe.

The Lapps are, at least linguistically, a branch of the Finnish family, and occupy the extreme north of the Scandinavian peninsula and of the adjoining Russian domain. They are subdivided into fishing or Coast Lapps, and Reindeer or Mountain Lapps, the so-called Fjeld-Finns, who lead a nomad life with their reindeer herds, and who present the purest type of the race. The former live by fishing, and are called either, 'Elv-Finns" or "Sea-Finns," according as they fish in fresh or salt water. These various branches are called "Skolte-Finns" in Russia when they belong to the Orthodox Church. They are of low stature, but robust, with broad features and pointed chin. They are of a peaceful disposition, and the Lapp always salutes with the word "peace." On the other hand he is greedy, avaricious, dirty, and is passionately fond of alcoholic drinks. They are still enslaved to many superstitions, and there are men and women amongst

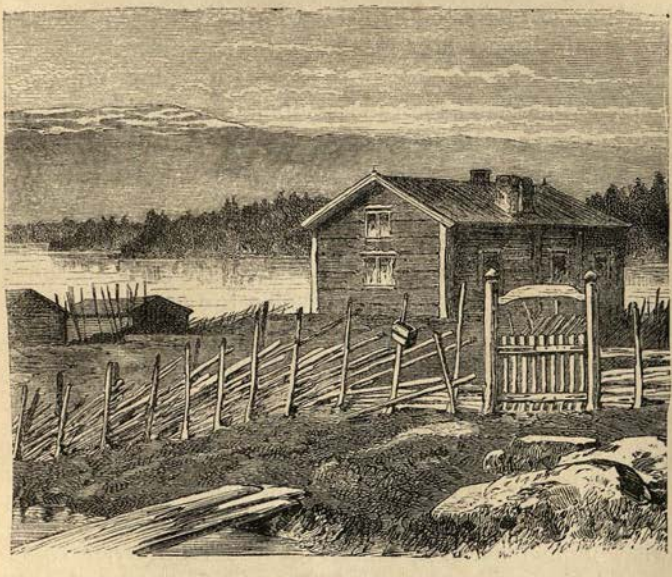
them who pretend to foretell births and deaths. These "charmers," as they are called, have their magic drums, with which they perform. The reindeer especially plays an important part in the offerings to the good and

LAPLANDER.

evil deities, and the belief still survives that the protecting spirit, who invisibly attends every Lapp during his lifetime, is afterwards conducted on a long journey in company with his soul and a young reindeer to wherever the deceased has done either good or evil, in order to determine his reward or his punishment accordingly. The

best of the race are the Norwegian Lapps; the Swedish, Finnish, and Russian Lapps standing each one step successively nearer to the savage state.

Amongst the Lapps the death-rate is now diminishing, while that of the births is on the increase. They are consequently growing more numerous, though the Lapp,



SCENE IN LAPLAND.

the moment he can speak Norwegian, denies his nationality, and soon assumes the Norwegian dress. Their literature, if it can be so called, is very limited, and, such as it is, has been composed mostly by Norwegians. It consists almost exclusively of short ballads and epics.

The Lapps have some notion of joint-stock concerns. Several will sometimes put their capital together, and work it according to a verbal agreement. But the capital

itself always consists of reindeer herds, the breeding of which, from the economical point of view, is still in its infancy. Were it conducted on rational principles it would be one of the most lucrative occupations of its kind in the world. Nor have the Lapps yet made much progress in the art of making the most of their labour. Yet the change in the female head-dress, the substitution of the Norwegian for the national form of salutation, and of the Finnish snow-shoes for their own, together with many other symptoms, show that they are capable of improvement. And they have the less difficulty in adopting new ways from the utter absence of any traditional sentiment in such matters. No one remembers anything of the national usages two generations back, and even their legends are not so much poetic echoes of the past as records of events such as might and do take place at all times amongst nomad tribes leading such a life as theirs. Even when making outward profession of the Protestant faith they seldom or never trouble themselves much about Christian dogma.

As they often indulge in a snow-bath they cannot be refused the credit of a certain cleanliness, although not over particular about the presence of reindeer hair in their soup, and, in consequence of the climatic conditions, somewhat indifferent to the state of the crockery. These nomads are extremely good-natured when treated properly, and yield a ready obedience even to harsh orders when accompanied by energy and firmness. Except in the matter of reindeer, the appropriation of which they do not profess to regard as theft, they are honest enough, and quite trustworthy when employed as carriers. They are the only available means of transport and guides over the snowy wastes of their boundless table-land, and as such exhibit marvellous tact in finding and following the path.

CHAPTER IX.

THE KINGDOM OF DENMARK.

1. *People—Language—Copenhagen and other Towns.*

THIS little State contains a population of nearly 2,000,000, almost exclusively Lutherans, and enjoys a strictly constitutional government. It is officially divided into thirteen circles, of which four are in the islands and nine on the mainland. Besides the Faroe group and Iceland, which has a constitution and legislative assembly (Althing) of its own, Denmark possesses colonies in Greenland, forming a northern and southern inspectorship, and in the West Indies, where she owns the islands of St. Thomas, St. John, and Santa Cruz.

The Danish people have made important contributions to the cause of letters and general culture. The language, which is somewhat harsh and rude, is well suited for the expression of childlike thoughts, and Andersen, whose wonderful tales are well known in their English dress, in many respects resembles the Norwegian writer Björnson. It is also adapted to tragedy, which dispenses more readily with the graces of composition. The Dane himself is a pleasant neighbour enough, so long as you do not hurt his national sentiment, on which point, like the Swede and Norwegian, he is extremely sensitive.

Copenhagen (Kjøbnhavn = Merchant's Haven), capital of the State, and residence of the king, forms the central and most attractive point of the extremely interesting

group of islands between Jutland and Sweden. On February 1, 1880, its population was 235,000. In this strongly-fortified seaport are centred all the learned institutions of the country, colleges, a university, academy of arts and sciences, magnificent museums, several literary and co-operative associations, many excellent educational

THE FREDERICKSBORG, COPENHAGEN.

establishments, and extensive factories. Here are lofty houses, often six storeys high, numerous public buildings, decorated in a severe and correct style with escutcheons, or artistic gables and dormers. Amongst them are the palaces of the old and wealthy aristocracy, and many sumptuous royal residences, which sprang up during the active architectural movement of the eighteenth century, though avoiding the tastelessness generally elsewhere

characteristic of that period. Besides the broad streets provided with convenient footpaths, and the many open squares planted with trees and embellished with monuments, the city is now traversed by much-frequented tramways leading to the various pleasure-grounds and attractions in the neighbourhood. Amongst the numerous museums conspicuous are those of the great Thorwaldsen and of "Northern Antiquities;" and of the places of public resort the most notable is the justly-celebrated Tivoli, an extensive garden or park, well laid out and adorned with many ornamental streams. Another feature of the place is found in the pleasant walks on the high dam or mound leading northwards along the shores of the Sound, and commanding an animated view of the vessels sailing through the narrow branch of the sea between the city proper and the island of Amager.

Amongst the other Danish towns the most noteworthy are Helsingör (10,000 inhabitants), the Elsinore of Hamlet, with its castle of Kronenborg barring the passage of the Sound; Odense (21,000) on Funen; and on the mainland Aalborg (pronounced Olborg), with 14,000 inhabitants, and Aarhuus (pronounced Orhûs) with 25,000 inhabitants.

2. *The Faroe Islands.*

Amongst the Danish possessions here claiming attention are the Faroe Islands, which have a total area of upwards of 500 square miles. They are a steep, rocky archipelago, entirely treeless, lashed by the Atlantic storms, and having a raw and moist climate, with a fauna as limited as is their vegetation. The animal kingdom is represented principally by horses and a breed of half-wild sheep, whence the group takes its name, besides the caaing or black whale (*Delphinus globiceps* or *Globicephalus melas*), here captured annually in large numbers.

The inhabitants, about 1000 in number, are occupied in collecting eider-down, fishing, and seal-hunting, and possess a not inconsiderable trading-place in the little town of Thorshavn on Strömö.

3. *Iceland and its People.*

But much more important in every respect than the Faroe group is the large island of Iceland, the *Ultima Thule* of the ancients. The population numbers about 70,000, all Lutherans, and claiming with some justice to be at once the youngest and the purest of all the Aryan races in Europe. They are certainly still the purest of the Teutonic branch, and their speech, which has departed but little from the old Norse type, is much the same as that of the first settlers in the year 874 of the Christian era.

The Icelanders, tall and robust, quiet, earnest, and prudent, and of simple habits, address every one in the second person singular, are hospitable and lovers of freedom, but also litigious and hopelessly self-opinionated. Though field operations are not absolutely impossible in Iceland, the ripening of the crops depends upon so many contingencies that it becomes cheaper to import than to grow corn. On the other hand, the island is well suited for grazing, and at every farmstead may be seen a so-called *tun*, or plot of good, vigorous grass, enclosed by a stone wall. Haymaking lasts from the middle of July to September, and all hands that can be spared now betake themselves to the interior of the island in order to mow the crops on the uplands.

The west and south-west coasts abound in fish, and here the fisheries are of great importance to the natives. Of less consequence is the fowling along the coast, though the eider-duck yields fair returns. It would be difficult

to find a less cleanly people than these islanders, amongst whom the use of soap, combing the hair, washing and bathing, are practices never willingly indulged in. Nor are there any recognised trades or crafts. Everybody is his own "Jack-of-all-trades," and to all the farmsteads is attached a forge where horses can at all events be shod. The dwellings stand mostly apart, often at great distances from each other, and seldom forming hamlets or townships. The walls are of stone and turf, the roof also of turf, and the rafters, doors, and gables alone of wood. The *baer*, or farmstead, usually consists of several little huts, each forming one chamber, the dwelling-place of the family, the so-called *badstofa*, which is approached by a little trap-door. The fireplace is unprovided with a flue, so that every house is redolent of the odours produced by the peat-smoke, dried fish-bones, and sheep and cow dung kept burning night and day. Here also the arrangements are in other respects of the most primitive, and the light penetrates only through a few little openings in the roof. However, the houses are somewhat better in the lowlands and trading-places, where advantage is taken of the drift-wood thrown up along the coast.

As in all primitive communities, the distinction of classes is but partially developed in Iceland. The decrease of wealth since the settlement of the country has also had a very levelling effect, poverty having caused the upper classes gradually to disappear, so that everybody is now socially pretty well as good as his neighbour. Yet there may here and there still be detected some leading social elements. The foremost rank consists of the clergy and officials, the second of the traders, and the third the *Thomthussmen*—that is, those owning no cattle. A fourth and numerous class is formed by the poor, whose support is a heavy burden to the community. Though not very remarkable for culture or refinement, the traders are still

enabled by their wealth to play a certain part in society. Most of these merchants are Danes, but their numbers are now diminishing, owing to the sharp competition of co-operative associations, which threaten soon to drive them altogether from the island. Great results are anticipated from the expulsion of these traders, as the money will then remain in the country instead of finding its way to

FUNERAL IN ICELAND.

Copenhagen. So argue these northern political economists. The great test of social distinction amongst the rural population is the cow. To the class of the *bondi* belong all those who possess a cow and keep her on a plot of grass farmed by themselves, whether as actual owners, tenants for a term of years, or simply renters of the land.

The greatest outward consideration is enjoyed by the government officials, amongst whom the most im-

portant, though not the first in point of rank, is the *Syslumann*. The Syslumann is a king in his own department, uniting in his own person the most varied magisterial functions. Nevertheless cases of maladministration are of rare occurrence, although the supervision exercised over these officials is far from severe. But the real promoters of Icelandic civilisation, the instructors of youth, the guardians of the people's morals, are the evangelical clergy. The Iceland minister is not merely a preacher of the gospel and dispenser of the sacraments, but also a receiver of the tithes, churchwarden, vestryman, ecclesiastical commissioner, president of court, justice of the peace in his parish, parochial registrar, school inspector, and, over and above all this, manager of the glebe lands. And as the State troubles itself but little, if at all, with the spread of elementary instruction, the clergyman looks after this also; hence it is that amongst adults nearly all the men and most of the women possess a certain fluency in writing, and even in reckoning. In other respects, however, these mutual relations tend to blunt the mental faculties of the people, and bring them under the absolute sway of the clergy. Nowhere else does the Church at present enjoy greater influence in the family circle, nowhere else does religion play a greater part in everyday life than in the strictly Protestant Iceland.

Reykjavik (2000 inhabitants), the little capital of the island, situated in the south-west, is the centre not only of the secular and ecclesiastical administration, being the seat of a bishop and prebendary, but also of science and letters, of trade and commerce, for the whole country. Nor is life in this Icelandic town at all so unsociable as might be imagined. In winter balls and evening parties are frequent enough, whilst private and amateur theatricals, open to the general public for a small fee, are amongst the most popular entertainments.

CHAPTER X.

THE BRITISH ISLES.

1. *Physical Conditions of England's Greatness.*

"THE maritime position of England, her mild climate, moist atmosphere, copious streams, and fertile soil, combined with the main direction of her water systems, the fortunate configuration of her coast-line, and its numerous and commodious harbours, constitute the essential physical conditions of the independent and universal development of her inhabitants, as well as of their political, or rather cosmopolitan, relations. Through the expansion of her naval power, possible only under such conditions, and through the spread of her colonial system in every direction, embracing all the seas and zones of our planet, the little island of Britain has indefinitely enlarged the narrow limits of her dominion, and still more of her civilising influences.

"The heart and centre of all these endless ramifications is England, 'the mother of empires.' She gathers to herself the varied products of her dependencies, not to accumulate them in mouldering heaps, but to work up the raw materials in her countless factories, and thence diffuse them on all sides as manufactured goods at a tenfold enhancement of their original value. Back to England as to a common fountain-head flows the might, the fulness, and the wealth of her thousandfold relations with all the world."

POLITICAL MAP OF THE BRITISH ISLES

SHETLAND I.
Note
Parliamentary Boroughs and County Towns with more than 50000 inhabitants are shown thus York
County Towns with less than 50000 inhabitants Lancaster
NORTH SEA
IRISH SEA
ENGLISH CHANNEL
FRANCE
Longitude West & from Greenwich

London: Edward Stanford, 55 Charing Cross.

Such are the terms in which Carl Ritter has characterised the United Kingdom of Great Britain and Ireland, which has long been the first commercial, naval, and colonial power the world has ever seen.

2. *British Ethnography—The Kelts—The Keltic and Iberian Theories.*

Let us add, that in considering this State we are dealing with the last of those belonging to the domain of the Teutonic linguistic group. We purposely say *the Teutonic linguistic group* rather than *the Teutonic nations*, because serious doubt has been thrown on the popular opinion that the present race of Englishmen and Scottish Lowlanders are the direct descendants of the Anglo-Saxon conquerors of Britain, and are consequently of pure Teutonic blood.

But before coming to the Teutons themselves it may be convenient to speak of their predecessors, the Kelts, who, though now reduced to a seemingly narrow compass, must necessarily remain one of the chief factors in the ethnology of Western Europe. Kelt and Gaul were, 2000 years ago, practically synonymous names for all the inhabitants of Gaul—the present France—as far south as the Garonne. The Keltic domain stretched eastwards to the Rhine, and two or three hundred years before the Christian era it even embraced the right bank of that river, while the name of Bohemia preserves, to the present day, a reminiscence of the Keltic Boii, its oldest inhabitants in historic times.

These Kelts of Central Europe were gradually pressed westwards by the Germans or Teutons, who were themselves being driven forward by the Slavs on their eastern borders. In any case the oldest known inhabitants of the British Isles were linguistically allied to the Gauls or

Kelts, and are therefore usually grouped with them. Of this once so widely-diffused Keltic family there still survive the Bretons of Brittany, in France; the Welsh of Wales, in England; the Gaels of the Scottish Highlands; the Irish, now chiefly in Munster and Connaught; and the Manx, in the Isle of Man. To these, some 150 or 200 years ago, the now extinct Cornish of Cornwall might have been added.

All the Keltic tongues form two distinct groups, commonly spoken of as the Gaedhelic and the Kymric.[1] The first embraces the dialects of Ireland, the Scottish Highlands, and Man,—all three closely related, and differing mainly in their orthography and pronunciation. In fact, there can now be little doubt that the Scottish Highlanders and the natives of Man are Irish colonists within the historic period. The Kymric or South British branch comprises the old Gaulish and Cornish, both extinct, the Breton, Armorican of Brittany, and the Kymric proper, or Welsh of Wales. The Bretons are in all probability descendants of the South Britons, who were driven by the Saxons and Angles into the Welsh Highlands, Cornwall, and even beyond the seas into the old Armorica, which thence received the name of Britannia Minor, or Little Britain. Hence it is a serious mistake to regard the modern Bretons as descendants of the old Gauls, and their speech as a direct continuation of the Gaulish. This Gaulish language has been dead some fifteen or sixteen hundred years; the Gauls, whose blood is still largely diffused throughout the present population of France, having gradually adopted the speech of their Roman conquerors. Indeed, all the Keltish tongues that still survive may be said to be, more or less rapidly, dying out.

Some English writers, such as Luke Owen Pike[2] and

[1] See also Prof. John Rhys' *Lectures on Welsh Philology*, 2d ed., 1878.

[2] *The English and their Origin*, etc.: London, 1866.

the late Dr. Thomas Nicholas,[1] have endeavoured to show that the old British or Keltic element that preceded the Anglo-Saxon conquest still forms the main ingredient in the English race. At any rate, Henri Gaidoz, a very competent judge, is of opinion that the general assumption of a wholesale extirpation of the Kelts by the Anglo-Saxons not only lacks scientific proof, but is in itself extremely improbable. The Teutonic invaders, in the fifth century, can have been accompanied by but few women, and alliances with the Keltic female population must have inevitably taken place very generally. It should also be observed, that in such cases the conquerors are not in the habit of exterminating the native element, but rather of enslaving and employing them for menial and hard work.

So far from being on the wane, the Keltic element is rather on the increase, owing to the large absorption of Irish, Highland, and Welsh blood in recent times. And if this Keltic mixture has to some extent deprived the English race of its original Teutonic character, other influences have been operating probably still more powerfully in the same direction. Professor Huxley has pointed out the presence of two clearly distinct ethnical types in the British Isles,—a fair and a dark type, such as are found also in France. The first he refers to the Aryan, the second to the Iberian, element, where it would be perhaps safer to substitute pre-Aryan, or pre-Keltic, for Iberian, at least pending further research into the aboriginal dark-haired European race. England, however, is thus no more a representantive of pure Teutonic than is France of pure Romance nationality. Nor should it be forgotten that the English, strictly so called, whose ethnological position has here been under discussion, form but a portion of the entire population of the British Isles, and that the rest, whether in Wales, the Scottish Highlands,

[1] *The Pedigree of the English People:* London, 5th ed., 1878.

or Ireland, are unquestionably Kelts, apart at least from a possible Iberian or pre-Aryan substratum.[1]

The population of Great Britain has increased during the present century with astonishing rapidity, and though that of Ireland has declined, it must be remembered that this is far from being the case with the number of the Irish people, great crowds of whom emigrate not only to the United States, but also to the sister island.

An interesting phenomenon is the continual decrease in the death-rate, notwithstanding the rapid increase in the population of late years. The Board of Health returns clearly show that the mortality in the towns has less to do with the geographical position or the climate than with the more or less efficient sanitary measures of the Corporations. It is not a little remarkable that in London, the largest city in the world, the death-rate is lower than in any other large European town. In the rural districts the longevity is very great. On the other hand, it has been calculated that in England 78,000 persons suffer yearly from complaints brought about by insufficient nourishment, and that of these about one-half perish.

3. *Religion—The Established Churches—The Dissenters.*

In the British Isles the State recognises two "established churches," both the result of the great schism of the sixteenth century from the politico-religious ascendency of the Roman Church. These are the Anglican or Episcopalian, in England and Wales, and the Presbyterian in Scotland. The great mass of the Keltic element in Ireland has remained faithful to the old religion, and

[1] On the physical characteristics of the people of the British Islands, see the final Report of the Anthropometric Committee of the British Association published in the *Report* of the Southport Meeting held in 1883.

in that country the Protestant establishment has been abolished.

The numerous religious sects not belonging to the State Churches in England and Scotland differ greatly both in doctrine and Church government.

The Church of England takes precedence of all others, being the National, or rather the State, Church. Its doctrines are summed up in the so-called Thirty-nine Articles. But the interpretation of these Articles has given rise to various discordant opinions, leading to two main antagonistic currents of thought. One of these, apparently approaching the Catholic form of ritual, is known as the *High Church*, of which the *Ritualists* are the highest development. The other, or *Low Church*, as it is called, professes to adhere strictly to the principles of the Geneva Reformer.

The Anglican Church is governed by the Archbishop of Canterbury as Primate and first peer of the realm, who officiates at the coronation of the sovereign, and claims jurisdiction over all the colonial bishops; by the Archbishop of York, as Primate of England; and by thirty bishops. Both the archbishops and twenty-four of the bishops have seats in the House of Lords. The appointments are made by the Crown, though in the case of the older sees—that is, all except Gloucester and Bristol, Chester, Peterborough, Oxford, Ripon, Manchester, St. Albans, Liverpool, Truro, and Newcastle—the form of an election by the Dean and Chapter of the vacant see is gone through, that body receiving from the Crown a *congé d'élire* or licence to elect the person nominated.

The lower clergy includes deans, archdeacons, rural deans, and incumbents of parishes, with their curates or assistants. The number of ecclesiastical parishes (the boundaries of which do not always coincide with those of the civil parishes) is now about 14,000, and the incumbents bear different titles (rector, vicar, or perpetual

curate) according to the nature of the right which they hold to the ecclesiastical revenues of the parish. Perhaps about half the population of England and Wales professes to belong to this Church.

The other half is split up into a large number of sects, amongst whom the most important are: The Congregationalists or Independents; the Wesleyan Methodists, or followers of Wesley; the Baptists, who admit adults only to baptism; the Calvinistic Methodists, especially in Wales; the Unitarians; the Quakers; the Swedenborgians; the Moravian Brothers; the Plymouth Brethren; the Irvingites; the Free Christian Union; and the Sandemanians. The "Spiritualists" profess to hold direct communication with the souls of the dead. In Scotland the principal sects are the Free Church and the United Presbyterians.

All these sects have their own places of worship, and employ a variety of proselytising agencies and organisations for carrying on spiritual work.

Amongst the most remarkable religious movements of the times should be mentioned the undoubted encroachments of the Roman Catholic Church in England. The same phenomenon has been observed in the United States, whose religious condition bears a strong resemblance to that of Great Britain. Till the year 1851 the Catholic Church in England and Wales was divided into eight districts, each administered by a Vicar Apostolic appointed directly by the Pope. But in that year the hierarchy was re-established without the sanction of the Government, which led to some passing disturbances at the time. It consists at present of an Archbishop of Westminster and twelve bishops. In Scotland there were formerly three districts, administered by an archbishop and two bishops *in partibus infidelium*. But here, also, the hierarchy was restored in the year 1878.

Ireland has four Catholic archbishops — those of Armagh, "Primate of all Ireland;" Dublin, "Primate of Ireland;" Cashel and Tuam, for the four provinces of Ulster, Leinster, Munster, and Cashel respectively; and twenty-four territorial bishops.

The progress of the present Catholic movement in England has its historic explanation. Here the Reformation originated, not with the lower nor even the middle, but with the higher, classes. In fact, the Crown itself may be regarded as the founder of the English Reformed Church in the sixteenth century; and as the disrupture was mainly at that time the work of the aristocracy, we now see the reactionary movement again initiated by the highest sections of the community, whence it is gradually sinking to the lower classes.[1]

4. *Public Instruction—Crime and Pauperism.*

The intellectual culture of the people varies greatly with the various sections of society. Not till 1870 did England possess any provision for a national school system at all worthy of the name, but since the passing of the Education Act in that year a great improvement has been effected in that respect throughout the country. The figures given in the Statistical Appendix will show how satisfactory has been the extension of elementary teaching in Government schools within recent years. By an Act passed in 1880 attendance at school is compulsory throughout England and Wales for all children between the ages of five and thirteen. In Scotland the state of matters has long been much better on the whole than in England, and the Act for that portion of the kingdom, passed in 1872, made

[1] G. Ravenstein, "Statistics of Roman Catholicism in Great Britain," in the *Geographical Magazine* for 1874, pp. 102-106.

elementary education virtually compulsory throughout the area to which it applied. In Ireland, however, elementary education is still in a very backward condition. It was placed in 1845 under the superintendence of the Commissioners of National Education; but notwithstanding all that has been done since that time, the average attendance of children at school is still only about one in ten of the whole population, instead of one in six, according to the usual mode of estimating the number of children of school age. A system of Mixed Schools does admirable work, but there is no compulsory attendance in any part of Ireland.

Even the higher education, with the two universities of Oxford and Cambridge at its head, still leaves much to be desired. It gives undue prominence to the classics, and is too much under the influence of the clergy. Meanwhile some enlightened minds, of whom there is no dearth in the English world of letters, are endeavouring with marked success to bring about a wholesome change in this respect. The chief defects that still remain in the higher education are the want of an adequate number of properly-equipped secondary schools, and the insufficient provision for scientific and technical education. But these defects are now at least beginning to be keenly felt by the leaders of the people, and the movement now in progress for supplying the wants indicated is going on with encouraging rapidity, more especially in the case of technical education, which is the most crying need of a people whose prosperity depends so much on the maintenance of their industrial pre-eminence. It must not be forgotten that the work of the Science and Art Department, and lately of the City Guilds' Institute, has done much to promote the cause of technical education in this country.

5. *Social Culture—The Proletariat.*

Nowhere else do the fruits of a slow but steadily advancing national development present such a marvellous picture as in England. The freedom of this development from all revolutionary or reckless precipitation finds its natural explanation in the conservative spirit forming the substratum of the English character, and actuating even the most advanced reformers. This spirit shows itself in the very tenacity with which the English cling to their old customs and usages; so that, although at the head of all European nations in modern progress, this nation has still in many respects retained more relics of mediæval times than any other.[1] Thus it happens that in this classic land of political freedom there are more sinecures than elsewhere; that the nobility nowhere else enjoy such political and social influence combined with personal respect, or the religious world such widespread preponderance, as here. Hence also a landed peasantry is almost unheard of in England, and the mass of the rural population is still compelled to till the land for others as hired labourers.

Side by side with this agricultural system the prodigious development of the national industries, embracing every conceivable branch of trade, has created an enormous proletariat class in the mining districts and manufacturing centres, a class which is often compelled to earn its bread under oppressive conditions. Women and children are obliged in ever-increasing numbers to perform hard work in gloomy, ill-ventilated, and unwholesome factories (though it is only fair to add that these factories are under official inspection), and the injurious consequences of these practices are manifested in depravity of every sort, but more especially in widespread drunkenness.

[1] See T. F. Thiselton Dyer's *British Popular Customs, Past and Present*, etc.: London, 1876.

6. *Character of the English People.*

As England has long constituted a world in itself, her children bear in their very features a distinctive racial stamp, causing them to be at once recognised amongst all national types. In no other European country does the citizen feel his own personal political importance so much as here. Hence he writes the pronoun *I* with a capital letter, and uppermost with him is the feeling that he, as it were, is the State. Every Englishman is animated by a sense of public spirit, in the truest acceptation of the term—a public spirit betraying itself especially in the loyal fulfilment of his duties towards the State. It may often doubtless outwardly assume a harsh and even forbidding aspect, but it creates that clear political foresight which renders possible such an omnipotent public opinion in England. Manliness, abidance by the law, love of family life, shrewdness, an enterprising spirit, industry, perseverance, devotion to the cause of freedom and of his country, are grand civic virtues, with which, in the light of history, no one will hesitate to credit the Englishman. Significant are the words on the façade of the London Exchange: "The earth is the Lord's, and the fulness thereof; the world, and they that dwell therein" (Ps. xxiv.) Herein breathes that grand spirit of enterprise, which aims at the peaceful conquest of the remotest lands by the weapons of humanising influences, of religion and free institutions. England has by this noblest of all foreign policies been enabled on the one hand to spread her sway and her commercial relations over the whole world, and on the other has become in the hands of Providence an efficient instrument for the universal diffusion of Christian thought and civilisation.

The Englishman is taxed with being cold and unsociable, and such he may be in his office or behind the

counter, for here he is nothing but the man of business. But follow him after business hours to his home and into the family circle, and he becomes at once transformed. You will now find him sociable and genial enough, developing a genuine humour of which you had no previous suspicion. He is reproached for over-cautiousness; but in such a vast sphere of intercourse mistrust becomes a virtue of primary necessity where misplaced confidence is a thousand times deceived. Out of this sphere obtain a personal introduction to the man, and you shall find his heart, his household, his confidence, entirely at your disposal, and you may depend upon him in every respect. You call him outwardly pious, perhaps somewhat of a hypocrite; but look round and ask yourself in what other country is there displayed so much moral power and excellence in the family, so much genuine faith in the individual, yet without sanctimoniousness.[1]

7. *London, Metropolis of the Empire.*

But perhaps the most eloquent witness to the great qualities of the English race is afforded by London, Metropolis of the British Empire, and the greatest city in the world. Its present population within the limits assigned to it in the registrar-general's tables of mortality (extending over 78,080 acres or 122 square miles) is nearly 4,000,000. It now stretches east and west along the Thames, here 600 to 900 feet broad, from Hammersmith Bridge eastwards as far as Plumstead below Woolwich, and from Hampstead and Highgate hills southwards to Norwood and Sydenham. The river is crossed by seventeen bridges connecting the northern

[1] Hobirk, *Wanderungen auf dem Gebiete der Länder- und Völkerkunde*, vol. ix. p. 10.

and southern, or, as they are more usually called, the Middlesex and Surrey sides of the metropolis. The houses stand at a mean elevation of about 40 feet above high-water mark at Trinity, sinking to 12 feet below the gauge in the Plumstead marshes, and rising to 430 feet above it on Hampstead Heath. Thus the ground on which London is built, far from being a level plain, is more varied than the most hilly capitals of the mainland. Its highest points surpass those of the seven hills at Rome, while the view presented by the Tiber is incomparably less grand and imposing than the stupendous panorama unfolded by the Thames as seen from London Bridge by day or by night.

A convenient starting-point for a general survey of this colossal city is the Strand, lying between the City proper and the West End, and in and about which are situated most of the theatres. At its western extremity is Charing Cross, with Trafalgar Square, Nelson's Monument, St. Martin's Church, and the National Gallery. Beyond it, stretches Pall Mall as far as St. James' Palace, flanked on both sides by numerous clubs, mostly palatial structures of stone, remarkable for the purity and grandeur of their architecture. From Pall Mall, Waterloo Place leads northwards to Regent Street, on the whole, perhaps, the most effective of all the London thoroughfares, and in the season densely crowded with the equipages of the fashionable world. Yet all this tumultuous and seemingly chaotic traffic moves along with a well-regulated and almost solemn dignity highly characteristic of the people. Here the daily throng of carriages, cabs, omnibuses, and vehicles of all sorts is almost greater than in Paris during the Carnival. Nor is it much less if we pass into Piccadilly, which partly skirts the Green Park as it stretches westwards, to "Hyde Park Corner." About a mile to the north, and parallel with it, runs the great artery, ex-

tending in an unbroken line east and west from Ealing and Acton through Notting Hill, Oxford Street, and Holborn, to the City, the numerous shops and warehouses and general movement, especially in Oxford Street, somewhat recalling the life of the Paris Boulevards. Still farther north lies the magnificent Regent's Park, with its endless rows of stately terraces, its zoological and botanical gardens, its avenues and miniature lakes and islands, animated, like all the other ornamental waters in London, with swans, ducks, geese, and other half-domesticated waterfowl.

The other sights of the metropolis are innumerable, conspicuous amongst which are the glorious cathedral of St. Paul's; Westminster Abbey, "the apple of the eye of England;" the Tower, with its historical reminiscences; and the British Museum, the temple of modern science and letters. The collections of the British Museum are now stored in two separate buildings, one in the heart of the town and the other, containing the natural history collections, a magnificent new building in South Kensington.

The various districts often present the most striking contrasts, producing an infinite variety, which is undoubtedly one of the causes of the subtle fascination exercised by London on all those who have for any length of time resided here. Contrasts such as those between the busy life of the streets in the City and the grand but silent squares of the West End, or between the dingy squalid regions of Whitechapel and Bethnal Green in the East End and the attractive suburban districts north and south, or between the docks and shipping of Limehouse and Blackwall, and the stately Hospital (now a naval college) and wooded heights of Greenwich on the opposite side of the river, are nowhere seen, at least on such a vast scale, outside of the metropolis. At the same time

the London houses are not, as a rule, built in the grand style of those of the Paris Boulevards. They are mostly of brick, averaging not more than three or four stories high, and often closely resembling each other in whole districts. This is partly due to the absence of building stone in the neighbourhood, and partly to the ambition the Englishman shows to possess a house all to himself.

The environs of London are extremely picturesque, and otherwise very interesting. The immediate neighbourhood is dotted with towns and villages, amongst which are Sydenham, with its famous Crystal Palace; Woolwich (42,000 inhabitants), the chief depôt of the English artillery; Kew, with a splendid botanical garden; Richmond, beautifully situated on the Thames, close to the magnificent park of like name; Hampton Court, with paintings by Vandyck, Holbein, Gainsborough, Reynolds, and others; Windsor, on the right bank of the Thames, the summer residence of the royal family; and Eton, on the opposite side of the river, with one of the principal public schools in England. Farther off are the much-frequented watering-places of Brighton and Hastings, on the Sussex coast, the former sometimes called "London-on-the-Sea," the latter, near Senlac and Battle Abbey, marking the site of the battle where Harold fell and the Normans triumphed. There remains, lastly, to be mentioned the lovely Isle of Wight, off the Hampshire coast, with its numerous watering-places and the royal marine villa of Osborne. Close to Osborne is the little town and harbour of Cowes, often enlivened by whole fleets of yachts during the season.

8. *Other Chief Towns.*

Of the provincial towns of England the two most important are the two great Lancashire cities of Liverpool and Manchester, the centres of the cotton trade and in-

dustry, and the former the principal port after London, which it even exceeds in the value of its exports. The latter, which, including Salford, had in 1881 a population of 518,000, is an ancient city, its very name indicating by its termination that it is at least as old as the Romans, to whom it was known as *Mancunium*, and its manufactures were of repute as far back as 1352. It is the centre of a large group of considerable towns (Oldham, Bolton, Preston, Blackburn, Stockport, Ashton, etc.), all chiefly engaged in cotton-spinning and weaving, and industries directly dependent on these. Liverpool, again, is a town of comparatively recent origin. At the end of the seventeenth century it was still an insignificant place, but it has now outstript its rival in population and importance. At the census of 1881 it had a population of 552,000, and to this might be added the 83,000 belonging to Birkenhead on the other side of the Mersey, that town belonging to the same aggregate of population as the larger city. The six or seven miles of continuous docks at Liverpool present a sight unparalleled elsewhere in the world. The pre-eminence now enjoyed by Liverpool is again about to be contested by Manchester, which is at present promoting a project for constructing a ship-canal fitted to convey her supplies of raw cotton directly to her own warehouses, and carry seawards the manufactured goods produced in her tributary towns.

As Manchester is the centre of the cotton industry of Lancashire and Cheshire, so Leeds (309,000) is the chief of a number of large towns in Yorkshire (Bradford, Huddersfield, Halifax, Wakefield, Dewsbury, etc.), all engaged in woollen manufactures; while Birmingham (401,000), the chief town in the Midland counties, has its name as much identified with hardware as that of Manchester is with cotton. So also Sheffield (284,000) is associated with cutlery; Newcastle (145,000) with

coal, in the export of which, however, it has recently been outstript by Cardiff in Wales. Nottingham (187,000) is the chief seat of the lace and hosiery industries; Leicester (122,000) and Norwich (88,000) are those of the worsted manufacture, and the latter city is interesting as having owed much of its industrial prosperity to the Flemings who settled here in the reign of Queen Elizabeth. Portsmouth (128,000), and Plymouth (75,000), are the chief stations of the British navy, and are both fortified, the former having the most complete system of fortification in Britain.

9. *The Scottish Races—Edinburgh.*

Conservative as the English character is, a still more mediæval and conservative spirit pervades the atmosphere of Scotland, whose population is divided into two distinct elements. The Lowlands, wherein are situated all the industrial centres, are now occupied by the descendants of the Anglian settlers, who drove hence to the Highlands the former Keltic owners of the land. All the south and east of Scotland is almost purely Teutonic, the north-west Gaelic or Keltic.[1]

In the Teutonic domain are the centres of culture, the university towns of Edinburgh, Glasgow, St. Andrews, and Aberdeen; the principal seaports and centres of trade, Glasgow, Greenock, Leith, Dundee, Perth, Aberdeen, and the most densely-peopled districts.

Edinburgh (228,000), the capital, with its many striking natural features, presents a great wealth of picturesque and artistic beauty. It proudly boasts of the title of the Modern Athens, and has the reputation of being one of the handsomest cities in Europe. It is

[1] A. H. Murray, *The Dialect of the Southern Counties of Scotland*, etc: London, 1873.

completely commanded by the Castle, on the summit of a steep hill at whose foot lies Holyrood Palace. The swamp formerly bounding the hill on the north side has been converted into a blooming garden, embellished with fountains and monuments. Here is the grand memorial to Sir Walter Scott,—a statue in a sitting posture beneath a lofty and elaborate Gothic canopy. The Castle affords a magnificent view of the Old and New Town, with the island-studded Firth of Forth beyond. At various points the view is bounded by adjacent hills. On the north-west is the tree-clad Corstorphine Hill; on the north-east the Calton Hill, crowned by an observatory and several monuments, including the unfinished National Monument originally designed to be a Scottish Valhalla; on the south-east the Salisbury Crags and Arthur Seat; on the southern horizon the hazy blue hills of Lammermoor and the Pentlands, while the open country stretches away to the west.

Till within recent times the old town mainly consisted of two thoroughfares,—the High Street, with its continuation, the Canongate, leading from the Castle down to Holyrood; and the Cowgate, running from the Grassmarket at the foot of Castle Hill, parallel to and south of the High Street. Holyrood is the name of an abbey and a palace. The former, the more ancient, was first built in the twelfth century, and is now a ruin. The latter, as it stands, is a comparatively modern structure. Adjoining is the Queen's Park, in the midst of which rises the hill known as Arthur's Seat, with the beautiful Queen's Drive leading round it.

Glasgow (512,000, with the suburban towns 704,000) is the largest town in Scotland, and the third largest in the kingdom. It is the seat of a very varied industry, and an important seaport, while in its neighbourhood are the headquarters of the Clyde shipbuilding trade.

In contrast to the Lowlands, the Keltic portion of Scotland is one of the poorest regions in Western Europe. Cattle-breeding and fishing form the principal pursuits of the Highlanders, whose picturesque costume, consisting mainly of kilt and plaid, is, however, fast disappearing. The fresh-water fishing yields considerable supplies of trout and salmon, while the deep-sea fisheries, especially on the east coast, have acquired a vast development, yielding enormous quantities of haddocks, herrings, and stock-fish. The herring is notoriously capricious in its movements, and on it the people are largely dependent for their subsistence.

The Highlanders belong mostly to the Presbyterian Church, though a considerable number still adhere to the old religion. They are intelligent, and in some places well instructed, yet still tinctured with superstition.

10. *The Irish People—Religion—National Traits—Secret Societies.*

On a lower intellectual level stands a large part of the inhabitants of the sister kingdom of Ireland. The mass of the people are Kelts, though the English and Scottish element is now predominant in many parts of Ulster and Leinster. The first English invaders naturally settled on the east coast, whence they pressed the "wild Irishry" continually westwards, while gradually depriving them of all political rights. This process continued for many centuries from the year 1171, the date of the first arrival of the English, and sufficiently accounts for the prevalence of English blood in the east. This is also the chief centre of Protestantism. Everywhere, indeed, Roman Catholics form the majority, but about one-eighth of the population are Anglicans, and one-eleventh (in the north) Presbyterians. The Teutonic element has here, as elsewhere,

mainly adopted the Reformation, while the Irish Kelts have, on the whole, continued faithful to the Latin Church.[1]

The native Keltic population is well built, and endowed with a vigorous constitution, though often living in wretched hovels, sunk in the most abject poverty and ignorance, and subsisting almost wholly on a vegetarian diet. Driven by the failure of the potato crop in 1846 and subsequent years, by the system of short leases and wholesale evictions, besides other untoward circumstances, to emigrate in vast numbers (principally to America), the population has been decreasing, year by year, and yet the island is still supposed to be overpeopled. However, considerable improvements have been effected of late years, and justice requires us to add that the Irish have often had themselves to blame for many of their former troubles. They have long shown a tendency to form themselves into lawless societies, kept together by solemn oaths of secrecy. Out of this tendency arose the secret political association of the Fenians, whose avowed aim was the expulsion of the English and the establishment of an independent Irish republic. But the Fenians had long been preceded by the "White Boys,"

[1] It should, however, be noted that the early English settlers often became thoroughly identified with the natives, adopting the Irish language and assuming Keltic names, or at least substituting Irish for Norman and English affixes—*Mac* for *Fitz* and *son*, whence *Macwilliam* for *Fitzwilliam* or *Williamson;* in a word, becoming "*Hiberniores ipsis Hibernicis,*" that is, "more Irish than the Irish themselves." This section of the English population, as might be expected, has generally remained loyal to the Catholic Church, while most of the more recent arrivals—the "Cromwellites," the "Orangemen," so called from William III. of Orange, and others —were in fact Protestants when they settled in the country. This explains the singular fact that the Barony of Forth, in Wexford, though purely Teutonic, is also purely Roman Catholic, having been settled in the midst of a Keltic population at a very early date, and having become thoroughly Irish in national feeling long before the Reformation. The same is true of other places within the limits of the English pale.—*Trans.*

the "Ribbonmen," and other *social* leagues, whose object was to protect the tenant-farmer from his landlord when in arrears with his rent, and therefore liable to be ejected. The result was an organised system of murder, the victims being mostly the landed proprietors, or else the "middlemen" or agents, and occasionally the tenants themselves, especially such as ventured to rent farms from which members of the society had been evicted. These agrarian crimes became so common that the English landlords found it almost impossible to remain in the country, and generally withdrew, leaving their estates to be administered by the agents. The "Land League," and its successor the "National League," have of late years further tended to aggravate the relations between landlord and tenant.

What has been said will sufficiently account for much of the misery from the effects of which the country is but slowly recovering. The natives complained of the evils attendant on "absenteeism," but no landlord could very well be expected to remain voluntarily in a place where he ran the risk of being shot from behind every hedge. For a like reason it was found impossible to procure capitalists willing to invest their money in industrial undertakings, the success of which depended on the co-operation of the Irish peasantry. Large manufactures being thus out of the question, and small industries having been universally superseded, there remained no resource for the people except agriculture. But here again the Irish neglect stock-breeding, for which the country is especially adapted, and endeavour to grow cereals and other crops. They are particularly attached to the cultivation of the potato, which both impoverishes the land, unless relieved by a rotation of crops, and even when it does not fail yields at best but poor returns. It is greatly to be regretted that the Irish fisheries are much neglected.

In recent times the English Government has introduced many conciliatory reforms, conspicuous amongst which was the abolition of an alien Church establishment, and the passing of the Irish Land Act. Even the famine of 1846 was not altogether an unmitigated evil, since it led ultimately to the absorption of a large number of small and unprofitable holdings. In spite of the constantly-recurring political agitations, and the popularity of the so-called Home Rule movement, Ireland seems at length to have entered on a period of comparative prosperity.

11. *Government—Constitution—Army and Navy.*

Great Britain must be regarded as simply the mother-country, the heart and centre of a mighty political system, reaching to the remotest corners of the earth, and collectively bearing the proud title of "The British Empire." At its head is a sovereign with the title of king or queen, and the reigning monarch received a few years ago the additional title of Empress of India.

The British Empire is a strictly-constitutional monarchy, in which the power of the sovereign has gradually been reduced to little more than outward and personal prerogatives. Both Ireland and India are administered by Viceroys, whose official titles are Lord-Lieutenant of Ireland and Governor-General of India. The larger colonies—Dominion of Canada, South Africa, New South Wales, Victoria, and New Zealand, etc.—have also representative institutions framed on the model of those in the home country, with Governors-General at their head, appointed directly by the Crown.

The British army has ever been distinguished by its excellent discipline and valour, qualities which have usually more than compensated for inferior numbers in the presence of the enemy. Its organisation may, doubt-

less, be in many respects defective, and in technical and tactical details it may have failed during a period of protracted peace to keep pace with the progress of such professedly military powers as France and Germany. But for all practical purposes it is probably in a higher state of efficiency than at any former period. One branch at least of the service, the artillery, if inferior in quantity, is absolutely unrivalled in quality by that of any other State. The defences of the country have been greatly strengthened of late years by the Volunteer movement, which has been sustained with remarkable enthusiasm.

Both the naval forces and the merchant fleets of England are far superior in every respect to those of any other nation. The former are scattered all over the world, so that more than half of the fleet is employed on foreign stations.

CHAPTER XI.

THE KINGDOM OF PORTUGAL.

1. *General Aspect of the Country—Lisbon and its Surroundings.*

To most people Portugal is little more than a geographical and social expression, and it is seldom that the traveller, except when drawn thither by some special object, diverts his steps to this corner of Europe, containing though it does so much that is at once beautiful and interesting. The port of Lisbon (246,000 inhabitants), with its palace-crowned heights, may proudly compete for the palm of beauty with Constantinople, Palermo, Naples, or Genoa. If the prospect presented by the Tagus is surprising and impressive when seen from the land, from the quays, or, better still, from the heights of Lisbon, the effect is still further heightened when the picture is animated by life and motion,—when a black colossus with smoking funnel heaves anchor and makes for the sea, whose surface glitters away beyond the bar; but above all, when we stand on deck and survey the panorama as it glides silently by on the right and left. The eye ranges once more over the proud Lusitanian metropolis, embracing the hills and dales by the shores of Tagus with their dazzling white masses of houses, an unsurpassed picture of splendour and grandeur, the tops of the hills crowned by castle, cloister, and cathedral, and though betraying traces of neglect and decay, still presenting a prospect

such as can be seen only in the sunny south. Beyond us lies the boundless expanse of the bay, its blue waters shimmering in the sun, and enlivened by countless vessels of all sizes—smacks, East Indiamen, and steamers, the little paddle boats puffing and snorting on their way to the Punta Cacilhas, and farther on to Belem. To the south, mirrored in the bay, rise in clear sharp outline the heights of the Serra d'Arrabida, of S. Luiz at Setubal, and the castle of Palmella. As we sail seawards, on our left lie the steep limestone hills of Almada, on the right Belem, with its venerable cathedral, and square fort defending the entrance to the harbour. Over the waving hills north of the Tagus, dotted with many windmills, rise the imposing jagged outlines of the Cintra mountains, a long range of bold crests stretching from the Peninha to the lofty pyramidal peak of the Cruz Alta and the Pena, the stately castellated Moorish structure crowning the crest of one of the highest elevations in the Serra.

But on the whole a journey through Portugal can scarçely be said to repay the time and trouble, for points of real interest are scattered rather sparingly over the land. Places, doubtless, such as the commercial town of Porto or Oporto (106,000), the university of Coimbra, the monastery of Mafra (the Portuguese Escorial), the royal seat at Cintra, the famous Bernardine convent of Alcobaça, Basaco, Batalha, Leira, will probably repay a visit; but the scenery is, generally speaking, somewhat monotonous. In the low-lying districts we find arable land, varied here and there by patches of shrub and small groves. But along the rivers the landscape assumes a brighter character, the banks of the streams being fringed with massive leafy woods intermingled with soft meadow land.

2. *Character and Habits of the People.*

Towards the north the Minho forms the frontier line between Portugal and the Spanish province of Galicia. The Spanish town of Tuy lies almost within a stone's throw of Valença on the Portuguese side. Yet the inhabitants of both places are as different in dress, manners, and customs as are those of Dover and Calais. The custom-house and passport system often present more formidable barriers than a lofty mountain range, and intermarriages are nowhere less frequent than here. The Spaniard also carries himself rather haughtily towards the Portuguese, whom he affects to look upon as of an inferior race. Yet a recent traveller, John Latouche, gives the preference unhesitatingly to the latter, who seemed to him of a finer build, more pleasant manners, and more graceful garb. He admits, however, that the contrast is nowhere so striking as when the country is visited from the north, for the Galicians are amongst the very rudest inhabitants of Spain, and this province provides the whole kingdom with its "hewers of wood and drawers of water." Entre Douro e Minho is, on the other hand, the most flourishing district in Portugal.

Latouche assures us that while travelling through a great part of Portugal we might fancy ourselves in Arcadia. Not only the picturesque landscape of the pasturages along the river banks, and the large jugs of wine concealed in the leafy bowers, which the peasants apply sedulously to their lips, but their style of singing at the very top of the voice, one taking up the couplet from the other, presents altogether quite an idyllic picture. Their agricultural implements also are still of the most primitive description. The bullock waggons are an inheritance of the Roman occupation, having scarcely undergone any change since those days; while the plough

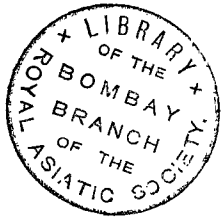
is nothing more than a crooked branch of a tree, which just scratches the surface of the ground, and may be easily carried on the shoulder. On the other hand, the Moors have left traces of their cultivated taste and sense of artistic beauty in the prevailing style of ornamentation and the forms of the earthenware. The yokes of the oxen are embellished with designs, doubtless of Moorish origin, while the golden trinkets and the nether garments also bear an unmistakable Oriental stamp.

The middle classes in the towns contrast unfavourably with the rough farmers and industrious peasantry. The larger inland cities have entire streets full of grand residences, in which the occupants vegetate from year to year, with just enough money to enable them to live without working. But in Portugal such a life costs but little. A large house with a cabbage garden in the rear, with whitewashed walls, floors innocent of carpets, a dozen wooden chairs, and one or two deal tables, and that is all! No fireplace or stove in dining or bed room, no window-blinds or curtains, no table-covers, picture on the walls, or table with its pleasant disarray of books, periodicals, newspapers, and fancy work; no flower-stands, "old china," clocks, or bronzes—nothing, absolutely nothing, of those hundred little trifles, which, with us, stamp the character of the owner and impart their special type and peculiar charm to the dwelling.

But the absence of all these things marks the extremely dreary nature of family life amongst the middle classes in Portugal. The women occupy themselves exclusively with a little needlework, much gossiping and hearing of masses, spending the rest of the day at the window; for, with the exception of the short walk to the church and back, the Portuguese lady scarcely ever shows herself in the street. The men lounge about amongst the shops and warehouses, smoke innumerable paper cigarettes,

and take their siesta at noon. With few exceptions the people are all Roman Catholics.

The costly splendour of the priesthood, combined with the sums lavished on royal palaces and pleasure-grounds in the wastes of Marfa, had thoroughly exhausted the kingdom, till, thanks to some successful enterprises, it has somewhat recovered itself in recent years. Railways have been constructed, but the highways required to feed them are still partly missing. Industry has been revived, and in the towns many municipal and sanitary improvements have been introduced. At the same time Portugal has preserved its sense of national independence, keeping it from being seduced or intimidated into too intimate an alliance with the unfortunate neighbouring state, and from thus imperilling its national development.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CHAPTER XII.

THE KINGDOM OF SPAIN.

1. *People—Discordant Elements of the Population.*

By far the greater part of the Iberian peninsula is occupied by the kingdom of Spain, which is about five and a half times larger, and at least four times more populous, than its Portuguese neighbour. Here also the Roman Catholic religion prevails almost exclusively. Protestant communities, however, have of late years sprung up in various places, though still far too inconsiderable to produce any marked impression on the Spanish people.

With their French neighbours the inhabitants of Spain agree in being made up of a great variety of races, and in speaking a large number of dialects. As the Norman, the Breton, and the Provençal are mutually unintelligible, the Catalonian, the Castilian, and the Basque fare no better in this respect. The only difference is that the idea of national unity has raised all the French races to a common political and social level, whereas in Spain a tendency towards divergence can in many cases scarcely be called in question. Hence, altogether apart from Portugal, the Iberian peninsula presents an ethnographic picture of the most varied character. Hence, also, it becomes easy to understand the formidable nature of the obstacles standing in the way of a thorough national consolidation of all the discordant elements in Spain. This country, in fact, requires

a special system of government for each of the provinces, and those rulers alone have ever achieved success and renown who cordially accepted and recognised this truth.

2. *The Andalusians.*

The most richly-endowed of all the Spanish races are unquestionably the Andalusians. They also are the least affected by the current disparaging reports touching Spanish treachery, fanaticism, and thirst for revenge. The Andalusian is far too light-hearted to be deceitful, far too kindly to be revengeful, far too happy and self-satisfied to be fanatical. For where is there anything comparable in his eyes to the perpetually serene heavens, the genial atmosphere, and the bounteous soil of the favoured land stretching from the Sierra Morena to the southern seaboard? This atmosphere invites irresistibly to the enjoyment of animal life, and the cheerful disposition of the people is affected neither by perceptible cold in winter, nor by oppressive summer heats. From the Sierra Morena refreshing breezes blow steadily down to the lowlands, so that the climatic conditions are nowhere so agreeably tempered as on the banks of the Guadalquivir. The Andalusian is consequently more satisfied than others with himself, his religion, and all his surroundings, and this sense of content is breathed in his whole bearing. He is obviously thoroughly convinced of his own personal advantages. He likes to array his symmetrical figure in sumptuous garments; he trifles with the fair sex; but his self-love is withal so artless and transparent that it becomes impossible to feel angry with him. At the same time the consciousness of his fancied superiority renders him neither overweening nor unmannerly. He is rather, on that very account, ever anxious to show himself in the most pleasant light, holding himself all the

time for the most agreeable fellow under the sun. Hence he is obliging, courteous, considerate, converses with unrestrained elegance and fascination, surpassing the Frenchman himself in gallantry towards the other sex.

In Seville, the capital of Andalusia, the stranger is at once struck by this pleasant enjoyment of life. The place itself is modest enough, and cannot even boast of the splendid monuments with which poets have endowed it. But here everybody is satisfied with his lot in life; and there is a gladsome air about the place that communicates itself at once to the stranger. The street architecture is itself peculiar, contributing more to the pleasant aspect of the place than would the grand buildings the poet dreams of. The eastern nations, as is well known, lavish all their genius on the decoration of the courts, by means of a rich display of flowers and fountains converting them into veritable little Edens, enclosed by shady cloisters. When the Christians became masters of Seville the floral splendour of these courts, or "patios," as they are called, found ready favour in their eyes, and they retained these domestic arrangements, although the eye of the Christian Spaniard is otherwise turned rather more to the outside than the inside world. They were accustomed to put up a balcony at every window, and they now simply superadded this feature to the Moorish arrangements. This was usually contrived in such a way that the passages and windows of the courts corresponded with the front windows. Hence the passer-by looks as through a sort of lantern into the very heart of every genuine Seville abode. It is obvious that this publicity occasions no annoyance, the light-hearted occupant of the glass house having no objection to the stranger's sharing in his imperturbably rosy views of life. When several families dwell in the same house all alike have access to the patios, with their fountains, cool air, and magic cheerfulness.

It is significant to know, that even in classic times the inhabitants of Bœtica—that is, of the present Andalusia —were always reputed the best dancers. In those days it was Cadiz that held the palm which is at present shared by the rival cities of Seville and Malaga. In other respects Seville has little to fear from comparison with the latter place. In a Spanish ballad Malaga is spoken of as "the city of perpetual spring," while the more famous Granada assumes rather the character of a widowed queen. Granada enjoys a pleasant climate, continually refreshed by the breezes from the Sierra Nevada. Malaga looks more like an earthly paradise, but Seville is, on the whole, the most delightful of Andalusian towns.

3. *The Castilians—Asturians—Gallegos.*

The other Spanish races may be well judged by contrast with the Andalusians. Best known to fame are the Castilians, a far less amiable people than their southern neighbours. The stiff yet exacting Hidalgo, the ceremonious yet indolent Caballero, the Ranudo de Colibrados, at once proud of his ancestry and content to wallow in the most abject poverty, are well-known Spanish types, but all characteristic exclusively of the various sections of Castilian society. Like the Andalusian the Castilian has a lofty opinion of himself; but, while the one is thereby rendered all the more amiable, the other endeavours to support the character by systematic imposition. Hence he aims not so much at producing the best possible impression as at establishing his own personal importance. Hence also he invented the term "grandeza," implying a quality sustained rather by a complicated ceremoniousness than by the inner worth of the man. At the same time the goal of his ambition is repose,—absolute repose and inaction. Like most Latin races, if compelled to work,

he likes to earn as soon as possible enough of capital to live indolently on the interest for the rest of his days.

Far more tenacity and perseverance are shown by the inhabitants of the north coast,—the Galicians, Asturians, and Basques. All three enjoy special repute for their personal skill, though in very different spheres. The Galician undertakes by turns all kinds of occupations, —day labourer, muleteer, domestic servant, and artisan. The Asturian, on the whole, prefers household duties; while the Basque, like the Castilian, too proud to wait on others, applies himself to farming and rural occupations. The Basques are extremely trustworthy, but stubborn, and therefore difficult to manage. The Asturians, on the contrary, are the most accommodating of Spaniards, and of tried honesty when once they identify themselves with the household. The "Gallego," or Galician, is the most addicted to gain, partaking at once somewhat of the Italian and the Swiss. Like the former, he will continue to work on after realising the amount he originally proposed to himself, so long at least as the feeling of home-sickness will allow him to remain away from his beloved though somewhat barren Galicia.

4. *The Aragonese, Catalonians, Valencians, and Balearic Islanders.*

The Aragonese, again, while the most enterprising, are also the most refractory children of the Pyrenean peninsula. These qualities are shared with them by the Catalonians and the Valencians, though not perhaps always in the same direction. The latter enjoy the worst reputation in Spain for their revengeful and bloodthirsty disposition.

The Aragonese were formerly extremely jealous of their political rights, and constantly on their guard against

the encroachments of the Crown. The Catalonians, in their turn, submitted reluctantly to the Aragonian power, and, later on, to that of the Spanish monarchy. On the occasion of civil war or revolution the Catalonians have always shown themselves most hostile to the central government of Madrid. At the same time it is not a little remarkable that in other respects the principality of Catalonia, with its capital Barcelona, is the scene of comparatively fewer lawless deeds than the rest of Spain, in this respect presenting the most favourable contrast, especially to the neighbouring province of Valencia.

The natives of the Balearic Islands, descended from several distinct stocks, show the greatest dislike to the Castilians, and partiality for the Valencians and Catalonians, whom they mostly resemble. Their language, like that of Catalonia, Valencia, and Provence, belongs to the Langue d'Oc, or southern branch of the Hispano-Gallic tongue, in mediæval times very widely diffused along the Mediterranean seaboard. It boasts of a somewhat rich literature, especially in poetry, is still carefully cultivated, and serves as the medium of intercourse even amongst the upper classes, though Castilian is now the official language of the courts and general administration. The people are described as courteous, kindly, and so honest that the doors are never bolted.

5. *The Basques: their Origin, Language, Character.*

The various Spanish peoples just described belong with one exception to the Aryan or Indo-European stock. The exception are the Basques, occupying both sides of the Pyrenees, consequently portions both of Spain and France. They are ethnologically one of the most interesting people on the face of the earth, as in them are now generally recognised the remains of the old Iberians,

a non-Aryan race occupying from the earliest historical times the south-west of Europe, and gradually thrust back or absorbed by the Kelts, who formed the first wave of the great Aryan migration advancing westwards from the Asiatic continent. The Basques, or rather their progenitors, were in prehistoric times probably widely diffused over Spain and Gaul, comprising the Ligurians of Italy and Gaul, the Sicanians of Sicily, and even the aborigines of North Africa before the Phœnician and Roman conquests, no less than the Iberians proper of Spain and Aquitania. And if we regard the Ligurians and Sicanians as branches of this once wide-spread race, we may well suppose that the whole of Italy was at one time inhabited by Iberians, and that the primitive Latins, the progenitors of the Romans, had to expel the kinsmen of these Spanish Iberians before settling on the Seven Hills. The English ethnologists, Profs. Huxley and Boyd Dawkins, are further of opinion that, before the arrival of the Kelts, the British Isles were also peopled by Basques, and that there has been more than one infusion of Basque blood in the Keltic element; nay, that in certain parts of England Basque blood is still in the ascendant, as Keltic and Teutonic are in others. Hence the obvious interest attaching to the few still surviving Pyrenean Basques for the student of comparative ethnography.

According to the investigations of Prince Lucien Bonaparte, one of the best living Basque scholars, there are four Spanish and three French provinces in which the Basque element is found, though the language is by no means spoken universally within the limits of this domain. It is also current in two bordering French villages, in some parts of Mexico, Uruguay, and La Plata, amongst the American offspring of Basque parents. There are in Europe altogether about 600,000 Basques, chiefly on

BASQUES.

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the Spanish side, the majority of whom, besides their mother-tongue, understand also the present language of the country. There are four principal dialects—those of Guipuscoa, Biscay, Labourdin, and Sule. At least these alone possess any literary importance, and it is very probable that the others—that is, the northern and southern Upper Navarrese, and the western and eastern Lower Navarrese—were never reduced to writing. The various dialects are not only distinguished by their pronunciation and grammatical structure, but differ even in their vocabularies, to such an extent that several Basque dialects are unintelligible to members of the same tribe. As to the possible relationship of Basque with any other linguistic family, Prince Bonaparte's researches militate against its connection with any known form of speech.

The Spanish Basques call their language *Euskara*, themselves *Euskaldunac*—that is, Euskara-speaking men—and their country *Euskalearia*. The French Basques call themselves *Bask*, from *Basok* = *man*, their speech *Basçunse*, and their land *Heskualherriak*—that is, the Basque estates.

The Basques were early converted to Christianity, whereby, doubtless, many important traditions and practices have perished which would have thrown light on some obscure points in their history. We know, however, that they formerly worshipped a great spirit called *Jaïnkoa*—that is, Lord of the Hills. The grave they called the "bed of the great rest," and for them death was a temporary sleep, out of which they awoke to a new life in which good deeds were rewarded and evil punished. Their traditions speak also of an evil deity, *Bassajaon*, or the "Wild Lord," still living in the mouth of the people, and occasionally pictured outwardly as a denizen of the woods.

From remote times the Basques have been recognised as daring and enterprising mariners. They were the first

to follow the whale to the Frozen Ocean, the first to reach Newfoundland, thence bringing ling and cod.

The Basques are, as a rule, slim and thin, but strong and powerfully built. They have gray eyes and rather dark complexion. They walk rapidly, and have a sure eye, springing from crag to crag, undazed by the height, and nimbly climbing the loftiest peaks. They are also good marksmen, skilful riders, indefatigable dancers, and excellent swimmers.

The women are generally well-favoured, delicately formed, of graceful carriage, with a charming complexion, shapely hands and feet, sparkling eyes, and a somewhat Grecian profile. They are lively, fond of pleasure, and coquettish. And to all these qualities they add a wonderful physical strength, not only sharing in the occupations of the men, but often displaying more powers of endurance than the sterner sex.

The Basques are distinguished by personal courage, love of freedom, hospitality, and an honourable adherence to their pledged word. They are, on the other hand, proud and exceedingly passionate, extremely superstitious, and great gamblers. They contrast favourably with the surrounding populations in the matter of cleanliness both inside and outside their houses, which in this respect almost rival those of the Dutch. In the Spanish Basque provinces there are, properly speaking, no villages, but only a large number of isolated houses scattered all over the land. A certain number of such dwellings, with the accompanying church, constitute a so-called "republic."

6. *The Spanish Gipsies—The Inhabitants of the Hardes Valley.*

Our description of the Spanish national types would be incomplete without a few words devoted to the Gipsies

or "Gitanos," settled from remote times in the southern towns, and especially in the old Hispalis or modern Seville.

"Whoever would observe the life and habits of the Spanish Gipsies," observes Wilh. Lauser, "has abundant opportunity for doing so if he betakes himself towards evening to the suburb of Triana on the other side of the Guadalquivir. No doubt it would be still better to pay a visit to the village of Alcala, about three miles off, where they still carry on their Troglodyte life on a gigantic mound of filth and refuse just as they have done for centuries. An antediluvian housing of the same kind at Triana was abolished by the magistrates in 1856, when the cholera raged and carried off the Gipsies like flies. But even at the present day this people cannot accustom themselves to the restraints of houses, and spend the greater part of their time in the streets. Here some of them work at the anvil, others bargain over an ox or a cow; the women spread out the cloth and old clothes with which they intend to go out hawking or to visit the market the next day; there a girl sings to a guitar one of those melancholy songs which overpower the heart with so strange a charm. . . . All appear to form only one family, easily recognisable by their dark skins, black eyes and hair, firm penetrating look, and the graceful slender structure of their bodies. They also get the credit of sincerely loving one another like members of one and the same family."[1]

On a still lower social level than the Gipsies stand the little known wild men in the romantic Hardes Valley, a dreary and isolated spot in the Sierra de Francos, in the south-west of the famous old kingdom of Leon, connecting with the Portuguese Serra da Estrelha. They were visited by Charles and Vicenti, who published an account of them in the *Globus*, vol. xiv. pp. 329-331.

[1] *Aus Spaniens Gegenwart: Culturskizzen*, Leipzig, 1872.

7. *Chief Towns—Madrid.*

After what we have said regarding the great variety of Spanish national types it is scarcely necessary to add that nearly all the chief towns in the several provinces possess a special character of their own, serving to illustrate their past history. The principal cities, as might be expected, are the capitals of the sixteen kingdoms and principalities out of whose union was formed the Spanish monarchy, and which have retained to the present day a certain provincial independence. The kingdom has now, however, been divided into forty-nine departments, including the Balearics and the Canaries, but with a total disregard of their historic nomenclature, each being simply named after its capital. Still, the old historic divisions are far too deeply footed and rest on too natural a foundation to be so easily set aside, and their old capitals are still surrounded by all the prestige of their former political significance.

Foremost in point of size and present importance is Madrid, the actual capital of the kingdom, which has not only greatly increased of late years, but has also undergone considerable changes, not a little to its advantage. The "Puerta del Sol," formerly an irregular space surrounded by houses of all sizes and styles, has been converted into a handsome regular square, with rows of splendid buildings, amongst them several grand hotels, institutions previously almost unknown in Madrid. In all the main thoroughfares fine structures and sumptuously-fitted cafés have sprung up, besides warehouses, whose flaming gas-lights enliven the streets of an evening. For its great architectural and other civic improvements Madrid has mainly to thank the railways, and, perhaps, even more the Isabella Canal, which, since 1859, has supplied the city with an abundance of pure water brought from the

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foot of the Guadarrama hills, rather more than 60 miles off, and which, likewise, serves to irrigate the surrounding district. The population has increased within the last forty years as rapidly as that of other capitals of Europe. From a little over 200,000 in 1844, it grew to little short of 400,000 at the census of 31st December 1877.

About 24 miles to the north-west of Madrid is the palace of the Escorial, attached to the famous monastery of San Lorenzo, founded by Philip II.

South of Madrid lies the historically-celebrated but now almost deserted city of Toledo, situated on a huge rock forming seven hills of various size, on the highest of which rise the proud blackened walls of the fourth and last Alcazar. Here streets and houses are huddled together one above the other, and Goths, Moors, Jews, and Spaniards, making the most of the available space, have each in their turn left their mark on these escarpments. The remains of former splendour are here as numerous as at Bruges or Pisa. Magnificent palaces and gloomy cloisters, on the brick and wood work of which have been lavished all the marvels of mediæval and modern decorative art, are crowded together. Fresh beauties are revealed at every step, and genuine art meets our gaze on all sides. Everywhere we light on *patios* (the courts enclosed by arcades already described), Arabian market-places, gateways adorned with armorial bearings, iron gates of exquisite workmanship, old-fashioned knockers, carved heads of animals, Gothic and Moorish bays, windows, frescoes, statues, and bas-reliefs. The population has now sunk to about 20,000.

Amongst the cities of the south pre-eminent stands Granada (76,000), with its world-renowned Alhambra, its Generalife,[1] or summer palace of the Moorish kings, the Cathedral, with its *Capilla Real*, in which Charles V.

[1] Arabic, *Jennat el Arif*, or "Garden of the Architect."

caused the remains of some of his ancestry to be deposited, honouring the site with noble monuments.

On the sea-coast is the flourishing port of Cadiz (65,000), a charming city, wealthy, yet homely, hospitable, and well kept. Its handsome, and not too narrow, streets are well paved, and the place is adorned with public squares laid out with flowers and plants, and a picturesque Alameda, or promenade, by the seaside.

But, next to Madrid and Barcelona, no Spanish city has undergone greater changes than Seville (134,000). The cathedral, with its giralda, or tower, carried to a considerable height by the Moors in the year 1000, and finished in 1560; the valuable Columbus library, with 20,000 volumes; the Alcazar, the magnificent residence of the Duc de Montpensier; the Museo de la Merced, with its famous paintings by Murillo and others; the University, some celebrated foundations, the Promenade de Las Delicias by the Guadalquivir, doubtless still remain the chief sights in the place. But not only have large factories and entirely new streets been erected in the vicinity of the railway terminus, but the interior of the old town has undergone a thorough change. At the same time, while gaining in size and beauty, and extending its commerce and industry, it has, on the other hand, nearly altogether sacrificed one of its former charms—the poetic life of the people.

8. *The Canaries—Gibraltar.*

Beyond the limits of Europe the Canary Islands are regarded as an integral part of the Spanish kingdom, and constitute a separate province.

On the other hand, to England belongs the highly-important Spanish town and fortress of Gibraltar, with a population of about 20,000 exclusive of the garrison,

which in time of peace consists of about 5000 men. The Rock of Gibraltar is about 1400 feet high, accessible from the west side alone, commanding the Straits of like name, and connected with the mainland only by a narrow isthmus. Here the apes of the opposite, or Barbary, coast still find a refuge under the protection of the British administration.

GIBRALTAR.

CHAPTER XIII.

THE KINGDOM OF ITALY.

1. *People—Emigration: its Peculiar Character.*

THE whole Italian peninsula now forms a single kingdom, which may be politically included amongst the great European powers. In any case, though not yet usually reckoned as such, its right to the position cannot be much longer deferred.

The Roman Catholic is the State religion, but perfect freedom of worship is now recognised. The number of non-Catholics amounts to no more than two per cent, of whom 43,500 are Jews and 36,000 Protestants, besides a few adherents of the Greek and Armenian Churches. Amongst the Protestants are comprised the 20,000 Waldenses in the district of Pinerolo in the Cottian Alps. Linguistically also, notwithstanding a very large number of distinct dialects, the nation has acquired a certain unity on the basis of a common literary language everywhere understood.

For the convenience of administration Italy is now divided into 69 provinces, all named after their chief towns. These 69 provinces form 16 historical divisions or compartments, which, though no longer of any political consequence, can never be effaced as geographical expressions. These are Piedmont, Liguria, Lombardy, Venetia, Emilia, Umbria, The Marches, Tuscany with Massa, Latium, The Abruzzi with Molise, Campania, Apulia, the Basilicata, the two Calabrias, Sicily, and Sardinia.

Somewhat under half a million of Italians, mostly engaged in commerce, are resident either in the various European states, where they are most numerous in France and Austria, or in other parts of the world, especially South America. A portion of the population, like the Irish reapers some years ago, or the hop-pickers in Kent, migrate every summer in search of work, returning with their earnings in winter. Of the 100,000 or so who leave the country annually about 80,000 do so with the intention of returning within the year.

Of the same unsettled character is the Italian Transatlantic emigration, in this respect differing from that of most other European nationalities. Herein the Italian character plays an important part, and has impressed a peculiar stamp on the national migrations. No Italian emigrates with the view of founding a new home elsewhere, but all return sooner or later with the money acquired abroad. It thus happens that the Italian, unlike the German, emigration is not only not injurious but actually beneficial to the country. In a word, the Italian migrates, never emigrates.

The emigration seaports are Genoa, Savona, Leghorn, Naples, and Palermo, though about nineteen-twentieths of the movement is carried on through Genoa alone. It is also somewhat remarkable that of the yearly migration over 75 per cent is furnished by the prosperous districts of North Italy, 11 by the Central, 9 by the Neapolitan, and 4 only by the Sicilian and Sardinian provinces.

2. *Social Culture—Public Instruction—Crime—Secret Societies—The Mafia.*

Of the high state of its intellectual culture ample proof is supplied by the current Italian literature, and by the numerous creations of art forming the pride of its cities,

museums, and private galleries. Italy is the storehouse of art in every sense of the term,—architecture, painting, sculpture,—and is especially rich in the grand monuments of ancient, mediæval, and modern times. The higher instruction is provided by twenty universities and about seventy lyceums; but the statistical returns still show the culture of the lower classes in an unfavourable light.

According to the census of 1881 the average number of the population above six years of age who could not read or write was 62 per cent. The state of educational matters grows worse as we proceed southwards. In Upper Italy the proportion was 41 per cent, in Middle Italy 64 per cent, in South Italy 79½ per cent, and in the islands 80 per cent. Still, an improvement in this respect is going on. The proportion of absolutely illiterate persons in 1881 is 7 per cent less than it was at the census of 1871. The most marked progress had taken place in Liguria and Piedmont, the least in the Basilicata, Campania, and Latium.

In intimate connection with the ignorance of the lower orders is their moral status. The passionate temperament of the Italians doubtless, to some extent, excuses the frequency of murder and personal assaults; but justice is also much impeded by the secret associations of the lawless classes. Over 200,000 persons may be said to belong to the *Mafia* and the *Camorra*, which, it may be incidentally remarked, has a secret language of its own.

The Sicilian *Mafia* and the Neapolitan *Camorra* answer to the *Squadraccia* of Ravenna and Bologna, and to the *Cocca* of Turin. Those who are familiar with the subject also assure us that ramifications of these societies are the Roman *Sicarii* and the *Pugnalatori* of Parma. The name changes with the locality, each district, besides its own local colour, producing new forms, which, though not

affecting the common basis of operations—the ideal unity, as it were, of the thing—still necessitates a fresh nomenclature. Hence the question, What is really meant by *la Mafia?* can receive no strict or definite answer. It will probably be best understood by describing what it is *not.* In the first place, the Mafia is no association with fixed and rigidly-drawn-up formulæ, or any special organisation. It has neither statutes nor definite assemblies, nor even any recognised heads. Still its definition does not quite correspond to the popular definition of *nothing*,—"a footless stocking without a leg." In truth, the Mafia has developed into something very substantial indeed, displaying the perfect embodiment of a truculent and unruly spirit directed towards sinister and lawless ends. In it is exhibited that instinctive and crude solidarity of interests animating certain individuals in almost every rank of society, who, to the detriment of the State and of the legal organisation of the body politic, seek to extort a livelihood and a comparative degree of social comfort, not from honest labour, but through fraud, intimidation, mutual mistrust, and open violence. Hence they are the sworn enemies of the State, although often its paid ministers and representatives, even in high places. All instinctively recognise a common fellowship in their joint efforts to weaken the authority of the law, to cripple the arm of justice, and break the power of the State. For this purpose they endeavour to neutralise the alliance of honest social interests in town and country. And this they seek to accomplish by widening the breach, not only between the governing and the governed, but also between the individual sections of the community,—in a word, by sowing the seeds of discord, of mutual suspicion, fear and hatred, on all sides. The consequence of all this is that public confidence is at a very low ebb in many parts of Italy.

3. *Trade and Commerce.*

Speaking generally, not only public security, but also the intellectual culture of the people, tillage, industry, trade, highways, canals,—in a word, all that goes to constitute civilisation,—is on a considerably lower level in Southern Italy and the islands than in the Central and Northern provinces, which latter are in many respects no way behind the most advanced European states. At the same time it must be confessed that the industrial activity and enterprise of the Italians, formerly so remarkable, has, on the whole, suffered considerable abatement.

At present the most flourishing branches of industry are also the simplest and most needful, or else such as nature contributes more to than man; as for instance, sericulture, profitably carried on in the north; olive oil, that of Lucca being especially famous; wine, flax, hemp, butter, and cheese. The manufactures, properly so called, though more or less skilfully carried on in all their branches in one place or another, can scarcely be said to be in a very flourishing state, even in the north, so that there are but few manufactured goods for which the country is independent of foreign industry. Besides such things as straw-plaiting, wax-works, mosaics, cameos, coral ornaments, in which she is unrivalled, Italy certainly possesses some more important manufactures, such as the cloth fabrics of Piedmont and Lombardy; the cotton goods, the iron and foundries of Genoa and Naples; the earthenware of Milan. Still all these branches are carried on in a small way, and are mainly restricted to the north.

Italian commerce, also, has greatly declined since mediæval times, owing mainly to the discovery of new sea routes opening up fresh channels for trade. However, an improvement set in after the construction of the Suez

Canal, which has restored to the Mediterranean a portion of its former importance.

4. *Character of the People.*

No other land is more frequently visited than Italy, and yet there is scarcely any other people regarding whose character so many erroneous opinions still pass current. Although we have ceased to associate the idea of the Italian with a picturesque brigand, or midnight assassin creeping stealthily on his victim with a stiletto concealed beneath his toga, and his face partly hid by his slouch hat, the word is still too often taken as synonymous with treachery, falsehood, revenge, laziness, filthy habits, and other equally uncomplimentary qualities. But whoever is willing to open his eyes, and judge impartially for himself is soon convinced by a short visit to the peninsula that there is scarcely a more inoffensive and amiable people than the Italians.

The Frenchman has in general the light and dark side of the sanguine, the Italian that of the choleric, temperament. But these features should in neither case be overdrawn, else we get a caricature rather than a truthful picture, and it should be remembered that both of these nations have a claim to rank with the very foremost peoples at the head of western culture. At the same time it cannot be denied that there is much in the Italian character which produces a disagreeable impression on the stranger, just as the charms of southern scenery itself are accompanied by many drawbacks. The suffocating dust and dazzling sun in summer, the uncomfortable houses in winter, the abject poverty and misery of the people, with their moral imperfections and uncleanliness, are features calculated to diminish the pleasure of a visit to the Italian peninsula. In illustrated books

of travel we see nothing but attractive sketches, from which we might expect to find every Italian landscape a terrestrial paradise. But the fact is that, as a rule, most of these picturesque scenes positively reek with filth, and even in the larger cities the select quarters alone are free from this charge. The streets are seldom swept, and the *immondezzajo*, a sort of licensed dunghill, is a familiar feature in most towns. It should, however, be stated that a great improvement has of late years been introduced in many places.

It is also a mistake to suppose that the Italian is thoroughly lazy and incapable of hard work. In order to see how industrious the people may be we should visit the neighbourhood of Naples, and especially the favoured country round about Capua, where the laborious tillage of the land will be apt to excite feelings of amazement. It is no longer in fact agriculture, as ordinarily understood, but rather the most careful garden culture, where the ant-like diligence of the people will not endure the smallest weed in their artificially irrigated and well-kept plots. And although labour is necessarily suspended in the glowing mid-day sun, the lost time is more than repaired by the late hours during which field operations are everywhere continued. This picture is equally applicable to Tuscany, Umbria, the Marches, and Lombardy. The Piedmontese "navvies," street-pavers, stone-cutters, quarrymen, etc., also display astonishing endurance and efficiency. And that the extraordinary sobriety and thriftiness of the Italians render them valued workmen even abroad is best shown by the fact that most of the railway works in Central Europe, and similar undertakings, such as the embankment of the Danube at Vienna, have been carried out by them.

5. *Provinces and Chief Towns—Piedmont, Turin—Liguria, Genoa—Lombardy, Milan—Venice.*

In proportion to its population Italy is one of those countries that boast of the greatest number of large cities. There are twenty-four with a total population of about 3,000,000—that is, over 10 per cent of the entire population of the country. The more important of these towns will be noticed in our brief survey of the various provinces of the peninsula.

At the eastern foot of the Alps, and separated by them from France and Switzerland, lies the largest of these provinces, the former principality of Piedmont (from *Pie dei Monti* = foot of the hills), a land nearly encircled by mountains, whose wild alpine valleys merge gradually with the fertile plains of the Po. It is covered with a closer network of railways than any other district in Italy. The inhabitants speak a *patois* half French, half Italian.

The capital of Piedmont, which, with Liguria and the island of Sardinia, formed the old kingdom of Sardinia, is Turin (253,000), on the Po, at an elevation of 700 feet above the sea. Formerly the capital of the Sardinian kingdom itself, and between 1861 and 1865 of the newly-founded Italian monarchy, Turin, the *Augusta Taurinorum* of the Romans, is one of the finest cities in Italy. It is clean, pleasant, very regularly built, the streets running mostly at right angles. It boasts of several learned institutions, museums, a university, and silk factories.

South of the Apennines is Liguria, a long narrow and very mountainous strip of coast, lying between the sea on the south and the Apennines on the north, which range is crossed at the Bocchetta Pass by the railway leading to Genoa. The soil is rocky and poor, but cultivated to the utmost by the industrious inhabitants. The manu-

factures consist of silken products and fabrics, velvets, plush, damask, gloves, soaps, and paper. The patois of the natives is still more disagreeable and unintelligible to strangers than that of Piedmont.

Genoa, capital of Liguria, presents from the Mediterranean one of the grandest city views in Italy. Pent in between the sea and the mountains, this strongly-fortified seaport has extremely narrow streets, with houses often seven or eight storeys high, scarcely penetrated by a

GENOA.

single ray of sunshine, yet flanked by splendid palaces, conferring on Genoa the proud title of *La Superba*. The bold span of the Ponte Carignano connects the two hills, on which lies the city with its 180,000 inhabitants. It is the most important commercial seaport in the kingdom, and possesses academies of art, libraries, an arsenal, wharves, and silk manufactures.

From the nature of the country all the other Ligurian towns lie also on the coast—on the Riviera di Ponente the ports of Savona and Porto Maurizio, and San Remo with its magnificent palm groves; on the Riviera di

Levante the much-frequented Chiavari and Spezia, the chief naval station of the kingdom, with a large arsenal, situated on a delightful bay between two bluffs, both crowned with a fort. The Bay of Spezia is at once one of the largest and finest harbours in the world.

The continuation of the Po valley, as it extends eastwards, forms the province of Lombardy, and, farther on, that of Venetia. In the north the land is very mountainous, the Alps sloping very abruptly southwards to the great Lombard plain. Here the ground is unusually fertile, and intersected by numerous rivers and canals. Of the industries, the most important are the silk mills, producing principally for home consumption. Stockings, gloves, and cloth are the only manufactured goods exported. The chief natural products are cereals, including large quantities of rice and *gran turco*, as maize is here called, flax, and hemp, excellent tree fruits, extensive mulberry plantations, and sericulture, besides olive oil and turpentine of a superior quality extracted from the Venetian larch. Cattle-breeding is also carried on in a large way, and the pasture lands are very fine, especially in the district of Lodi, as shown by the celebrated cheese which, though here prepared, is wrongly known in the trade as *Parmesan*—that is, of Parma.

The capital of Lombardy is Milan "The Grand," on the little river Olona, with a present population, including the suburbs, of 322,000, and in every respect entitled to be regarded as the Paris of Italy. It is a thoroughly modern city, with a character of its own, and a superabundance of material wealth and prosperity, as shown by the splendid new Corso Vittore Emmanuele. Yet Milan is, on the whole, rather a northern city, the Italian character being here much less obvious than in Verona. One fancies that the very people betray something of the heavy Teutonic type, and is involuntarily reminded of the Longo-

bards. But in other respects the mingling of races has produced beneficial results, and Milan was one of the great centres of intellectual life in mediæval times. Her voice is still decisive in the musical world, the opera house, La Scala, enjoying a European fame. Of world-wide renown is also the glorious white marble cathedral, a masterpiece of Italian Gothic. The city boasts further of the celebrated Brera Gallery, an observatory, an academy of science, and the Ambrosian Library, where Cardinal Mai discovered the palimpsest MS. of Cicero's *De Republica*.

North-east of Milan lies Monza, with a royal palace and extensive pleasure grounds; south of it the splendid Certosa, near the university town of Pavia (30,000) on the Ticino, and to the south-east Lodi. Farther east, and close to the Po, is the fortress of Cremona (32,000), famous for its violins, and to the north Brescia (61,000), Bergamo (40,000), and Como (24,000), beautifully situated on the lake of the same name, the Lacus Larius of the ancients. In the Val Tellina, watered by the Adda, are Sondrio and the hot springs of Bormio.

In the province of Venetia the attention is at once riveted by the famous city of Venice, "La Bella," built on piles amongst the lagoons north of the Lower Adige. Formerly mistress of the Adriatic, Venice lies about two and a half miles from the mainland, spreading in the form of a triangle over 118 islands, with 133,000 inhabitants. The façades of the houses are mirrored in the 157 canals here serving as the ordinary thoroughfares, the broad Grand Canal, more than two miles long, forming a sort of corso or main street winding picturesquely through the city, and flanked by a double line of Gothic and Renaissance palaces dating from the most brilliant period of art. The great marble bridge of the Rialto, the splendid cathedral of St. Mark with the Piazza of like name, the former palace of the Doges, the State

THE BRIDGE OF SIGHS, VENICE. *To face page 282.*

prisons, the rich library of St. Mark, and the Grand Arsenal with its cannon-foundry, are the principal monuments of this island-city. The lagoons are protected by sandy dunes, the so-called *lidi*, and by sea walls (*murazzi*) ten miles long, from the encroachments of the Adriatic, and by trenches (*tagli*) from being choked by the sands of the rivers.

Amongst the other noteworthy towns of Venetia are the university town of Padua, "La Dotta"—that is, "the learned" (72,000), on the Brenta, with the handsome church of St. Anthony; and Vicenza (39,000). On the rivers Adige and Mincio is the famous "Quadrilateral," consisting of the fortified towns of Verona (69,000), with a well-preserved Roman amphitheatre, Legnago (14,000), Peschiera (2000), and Mantua (28,000), on an island in the Mincio.

6. *The Emilian Provinces—Tuscany, Florence.*

Between the Apennines and the Po, consequently to the south of Lombardy and Venetia, stretches the province of Emilia, so named from the old Roman *Via Æmilia*, which led from Ariminum (now Rimini), on the Adriatic, through Bononia (Bologna), Mutina (Modena), and Parma, to Placentia, (Piacenza), on the Po. This province now embraces the former duchies of Parma and Modena, as well as Romagna, which latter comprised the Papal Legations of Bologna, Ferrara, Forli, and Ravenna.

In this region we meet with the fortress of Piacenza (35,000), on the Po; Parma (45,000), the former capital of the duchy, with many fine buildings and churches, a famous theatre, and a large trade in silk and cheese; Reggio (51,000); Modena (58,000), with a well-known picture gallery; Bologna (123,000), the oldest university town in Europe, and one of the oldest

cities in Italy, probably older than Rome itself, with a famous Campo Santo, concealing an Etruscan burial-place; Ferrara (76,000), a fortress on a branch of the Po; Ravenna (60,000), in the Marches, with some very remarkable early Christian monuments, and formerly a Roman seaport.

Beyond—that is, south of the Apennines—we enter one of the most flourishing regions in Italy—the present province of Tuscany, which, before the consolidation of the Italian monarchy, constituted an independent grand-duchy. In the north-east it is traversed by the Etrurian Apennines, which, with their various ramifications, cover one-third of the whole country. The rest of the land consists partly of fertile and picturesque hilly districts, partly of a marshy tract along the coast, the so-called *Maremma* bearing an evil repute for its unhealthy situation, and extending from Pisa southwards to Latium, and inland to the foot of the Apennines. The soil is very fertile, producing corn, rice, wine, oil, and fruits. Here, also, hot springs are found in several places. The industries consist chiefly of silk, straw hats, leather, paper, and mosaics. Nowhere else in Italy are the people more industrious or better educated than here.

Florence, on the Arno (169,000), the capital of the province, and from 1865 to 1871 the capital of the kingdom, lies in a fruitful and lovely valley, its fine situation, healthy climate, and splendid monuments, fully justifying its claim to share with Venice the title of "La Bella." For her pictorial treasures Florence knows no rival; her collection of antique statuary is surpassed by those of Rome and Naples alone, while she is unapproached by any other city for her monuments of the sculptor's art, dating from the sixteenth and seventeenth centuries. In architecture, also, she shares with Athens the praise of having stamped her own genius on all she pro-

duced, thus becoming a model for all European culture. In this branch of art Venice alone can pretend to a similar honour, though still far inferior in creative genius to Florence. The finest buildings are found in the centre of the city, round about the Piazza Santa Croce, including the Uffizi Gallery, the Palazzo Vecchio, with the Loggia dei Lanci, the gigantic masterpiece of the cathedral, with its marvellous belfry radiant with all the colours of the rainbow; lastly, the Church of Santa Croce, the Tuscan Pantheon. Crossing the Arno by the Ponte Vecchio, with its rows of goldsmiths' shops, we meet the Palazzo Pitti, splendid in its noble and simple proportions, with the Boboli Gardens rising in the background. Over the hills encircling Florence, on the right bank of the Arno, like a setting of gold, now runs a magnificent promenade, the Via de' Colli, with which even the Roman Pincio will not bear comparison.

On the Lower Arno lies the formerly powerful and well-built city of Pisa (54,000), but now, in spite of her university, dull and lifeless. Witness of her past greatness is the unique, though now silent, Piazza, round which cluster four of the most glorious monuments of architecture in the world—the Cathedral; the Leaning Tower, 177 feet high, with its summit more than ten feet from the perpendicular; the Baptistry; and the Campo Santo.

The present desolation of Pisa presents a striking contrast to the animation of the neighbouring seaport of Leghorn (Livorno), which, with its double harbour and nearly 100,000 inhabitants, has become a centre of the trade with the Levant, but otherwise offers nothing remarkable. A really charming place is the town of Lucca (68,000), which boasts of one of the finest and most remarkable churches in Italy. In its neighbourhood are some well-known hot springs.

In the interior of Tuscany are Siena (32,000 inhabitants), with a wonderfully beautiful marble cathedral and other architectural monuments; Arezzo (39,000 inhabitants), and Chiusi (the old *Clusium*), in the vicinity of Lake Trasimene.

7. *Umbria—The Marches—Latium, Rome.*

Here we enter the province of Umbria, which is watered by the Tiber, and traversed in its entire length by the railway connecting Rome and Florence. A peculiar feature of this region are the towns, perched, nearly all of them, on the summits of the spurs of the Apennines. This is the case with Perugia, Assisi, Orvieto, and even Siena in Tuscany, so that there is generally a long and difficult road from the railway station to the town itself. Sanitary considerations may have originally caused these sites to be chosen, the low-lying ground being subject to the malaria, while the air is pure and healthy on the hills.

The eastern slopes of the Roman Apennines bordering on the Umbrian frontiers embrace the so-called *Marches*, the most important place in which is the fortress of Ancona (48,000 inhabitants), situated on the most commodious harbour of the eastern seaboard.

The former and present capital of Italy is in the province of Latium, which, till recently, bore the name of the Patrimony of St. Peter. Rome, "The Eternal City," by the ancients spoken of simply as *Urbs*, or "The City," has again become since 1871 the capital of all Italy. According to the last census the population amounted to a little over 300,000. The city rests on several heights, of which the Palatine, Capitoline, Aventine, Cœlian, Esquiline, Viminal, and Quirinal, constitute the seven historical hills, whence it is often spoken of as the "City

of the Seven Hills." The last three, however, namely, those lying to the east, are not properly speaking hills, but rather promontories of an otherwise continuous plateau. It is at present spread also over the Pincio on the north, from which a magnificent view is afforded of the city, including the Janiculum and Vatican hills beyond the Tiber. The great mass of the modern city, which is intersected by the Corso, running in a straight line from the Piazza del Popolo in the north to the Piazza di Venezia, lies in the valley of the Old Campus Martius, stretching along the northern and eastern slopes of the Capitol, Esquiline, Viminal, Quirinal, and Pincio. The Palatine, Aventine, and Cœlian now belong to the district described as "Old Rome," because here are grouped together the principal remains of the classic city. Immediately behind the Capitol we look down on the venerable ruins of the ancient Forum, with the triumphal arch of Septimius Severus at our feet, and that of Titus in the mid distance, while in the background are the evergreen oaks of the Palatine, the Arch of Constantine, and the grand mass of the Coliseum. There are also some splendid remains of former times scattered over other parts of the city, amongst which the finest is the Pantheon, now transformed into a Christian church.

The old Rome, now almost deserted, and even exposed to the influence of the malaria, thus stretches to the south of the modern city, which occupies but a small portion of the space enclosed within the present walls. These walls, with a circuit of fourteen miles, comprise a total area of five and a half square miles, of which little more than a third are covered by houses, streets, and piazze, gardens and vineyards occupying all the rest. At present, however, the city is rapidly increasing, and encroaching upon many of these open spaces. On the Esquiline, the highest of all the hills, on the Viminal and beyond the

baths of Diocletian, entire new quarters have sprung up during the last few years, the modern and monotonous style of which seems like a desecration of the classic soil, here often concealing the most precious treasures. The excavations on the Esquiline alone have already supplied antiquities enough to fill a new museum.

Five bridges, the finest of which is the Ponte S. Angelo, the *Pons Ælius* of Adrian, connect the eastern portion of the city with the smaller division, the southern quarter of which is known as *Trastevere*. Here reside the very lowest classes of the population. The Trasteverini, however, boast that the purest blood of ancient Rome still flows in their veins, and artists still praise the classic forms, especially of the *Trasteverine*. A long straight street running by the Tiber, at the foot of the Janiculum, connects Trastevere with the so-called Leonine city, where rises at the extreme end of Rome the dome of St. Peter's, with the immense palace of the Vatican adjoining it. From the Piazza S. Pietro, enclosed by Bernini's grand colonnade, a straight street leads to the Castle of S. Angelo, the old *Moles Hadriani*, with its round massive tower surmounted by the winged statue of S. Michael the archangel. In the Tiber is the little island of S. Bartolomeo, usually called the *Isola Tiberina*, facing the famous *Ghetto*, or Jewish quarter, on the left bank. Here reside about 6000 Jews, not quite in the same state of squalor as formerly.

Rome is beyond all others a city of art and artists. The number of museums and collections representing every period of art is endless, offering every facility for studying the masterpieces of antique statuary side by side with the works of the Italian Renaissance. The churches and chapels also, of all sizes and of every age from the first rise of Christianity, contain an immense quantity of interesting objects, though but little now survives of the

ROME, WITH THE CASTLE OF ST. ANGELO AND BASILICA OF ST. PETER.

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ecclesiastical magnificence at one time distinguishing Rome as the metropolis of Christendom.

But, on the other hand, Rome is once more the capital of a great State, and as such has become the centre of administration, besides possessing a university and numerous scientific and literary institutions. But she has at the same time put on her work-day garb, and grows daily more like other large modern cities in their light, no less than their dark, aspect. The great charmer has herself been disenchanted, nor is it without a secret feeling of sadness that the visitor reflects that a time may yet be when little or nothing will be left to remind us that perhaps no spot on the surface of the earth is pervaded by a higher historic interest than the city which, not without a certain misgiving, we still name the Eternal.

8. *Puglia—The Basilicata—Calabria.*

The province of Puglia, corresponding mainly to the Apulia of the ancients, is exposed to protracted summer heats and droughts, obliging the people to store the rain in tanks. Nevertheless, with the exception of the somewhat arid shores of the Gulf of Taranto, the land is naturally fertile and well cultivated. A striking feature of this region is found in its numerous and populous towns, often situated on the crests of hills. Amongst them are Foggia, centre of the sheep-breeding; the seaport of Bari; Barletta; all places with upwards of 30,000 inhabitants, besides Brindisi, a town of smaller size (17,000), but celebrated in ancient times under the name of *Brundusium*, as the starting-point of the shortest sea-passage from Italy to Greece, and in recent times as the place of shipment for Eastern mails conveyed by the overland route. All these seaports on the south-east coast bear

more of a Greek, or even an Oriental, than an Italian aspect, with their low houses, always of a dazzling white, and with comparatively few windows towards the street.

Between Puglia and Calabria lies the province of the Basilicata, little favoured by nature, and whose capital, Potenza (20,000 inhabitants), lies far inland, near the source of the Basente.

The province of Calabria itself, which is about the size of the kingdom of Würtemberg, presents the aspect of an extremely rugged highland region, closely embraced by the waters of the Tuscan and Ionian seas. Rent by a thousand mountain gorges and chasms, its rocky shores rise abruptly and defiantly from the blue Mediterranean waves, which are overlooked at intervals along the coast by seven bold and craggy headlands presenting the appearance of frowning fortresses. Yet the land is highly favoured, producing many sub-tropical fruits, as well as cotton. The principal town is Reggio (39,000), the ancient *Rhegium*, on the Straits of Messina.

9. *The Abruzzi—Campania, Naples.*

To the east of southern Latium rise the rugged Abruzzi and Molise, the most mountainous and savage district in Italy, and owing to its high altitude adapted more to cattle-breeding than to tillage. A considerable number of the natives migrate yearly about the harvest time to the more southern or central provinces. Amongst the few towns may be mentioned the fortress of Aquila (18,000), Chieti (22,000 inhabitants), formerly Theate, and Teramo, a very ancient place, with many antiquities. Here we enter Southern Italy, properly so-called, which comprises the provinces of Terra di Lavoro or Campania, Apulia, and Calabria. In this latitude the climate is

very warm, but the heats are tempered by sea and mountain breezes, the hills being in places covered with snow. In the city of Naples snow forms an important article of trade.

The garden of Southern Italy is the highly favoured Campania, "Campagna Felice," with the far-famed shores of the Bay of Naples. Stretching for a distance of 2½ miles from Capo di Monte on the north southwards to the Castello dell' Ovo, and for nearly 4½ miles from the western extremity of the Mergellina to the eastern point of the Graniti on the sea-coast, Naples rises in the shape of an amphitheatre along a lovely, almost landlocked, bay, extending for 75 miles between the promontory of Miseno and the Capo della Campanella. In the foreground stand the picturesque outlines of Vesuvius, the Monte Sant' Angelo, and the islands of Procida, Ischia, and Capri, between which lies the outlet to the Tuscan Sea. In the distance appear the crests of the Apennines on the north and north-east, and close to the city Posilippo, with the grave of Virgil; on the west and north of it one of the most delightful prospects imaginable, embracing a view of the Camaldoli heights. Seen from the sea or from Vesuvius, the semicircular shores of the bay, from the classic Baiæ to Sorrento, seem to form one vast coronet, with the city itself like a brilliant gem flashing in the centre. To the charms of its romantic situation amongst the hills is added the almost tropical splendour of a luxuriant vegetation, for here bloom the cactus and the agave amidst groves of stone pine, orange, lemon, and palm trees. Mirrored in the glittering waters of the bay are its eastern neighbours—Portici, Torre del Greco, Torre dell' Annunziata, in immediate proximity to all that remains of the classic Pompeii.

Naples is the largest city in Italy, with a lively and extensive harbour protected by a mole, which gives to the

place the shape of the letter L. Its population at the last census amounted to 493,000. In art treasures it cannot certainly compare with Rome, Florence, and some other towns, and though on the whole well built, it boasts of but few noteworthy architectural monuments, these consisting chiefly of suppressed monasteries, workhouses, hospitals, and churches, more remarkable for their wealth than their artistic beauty. The lazzarone element, formerly so characteristic of this city, and at one time estimated at 80,000, has completely vanished.

10. *Sicily and the Sicilians—Sardinia—San Marino—Malta.*

The Strait of Messina, less than $3\frac{1}{2}$ miles wide, flows between the mainland and the large island of Sicily, which was once, but has long ceased to be, the granary of Italy. What is here most keenly felt is the absence of inland highroads, and especially of railways.

Notwithstanding the decline of the island it still contains many important towns, including three, Palermo, Catania, and Messina, with upwards of 100,000 inhabitants. Palermo, the capital (245,000), a handsome and regularly-built city, with a famous Gothic cathedral, lies at the foot of Monte Pellegrino on the north-west coast. Messina (126,000), on the strait of the same name, though containing little more than half the population of Palermo, is the chief seat of commerce and industry in the island. Catania (100,000), on the east coast, near the foot of Mount Etna, is likewise a prosperous city, though often threatened with destruction by earthquakes and eruptions of Mount Etna. In the south are Syracuse (24,000 inhabitants), greatly fallen from its former splendour; Girgenti, with the neighbouring mud volcano of Macaluba; and Terranova, the chief export

town for sulphur. At the western extremity of the island are Marsala, famous for its wine, now largely consumed in England, and Trapani, with extensive marine salt works.

The character of the Sicilian people is of a strongly marked and peculiar type, the result probably of the mingling of the most discordant elements. The island has been successively occupied and ruled by Sicanians, Greeks, Phœnicians both from Phœnicia and Carthage, Romans, Byzantine Greeks, Arabs, Normans, French, Germans, Spaniards, and Neapolitans, so that there has nowhere been a greater admixture of races than here. The aristocracy, though of Norman, Swabian, and Spanish descent, has become thoroughly Sicilian, now simply representing the highest and landed classes. In the blending of foreign blood the Arab, or rather Berber, and Byzantine, are still conspicuous, the former in the west, the latter in the east, of the island. While roaming through the hamlets of the western extremity towards Alcamo we often fancy ourselves for the moment in Barbary. Here the women lead a half secluded sort of life, while the impatience of control on the part of the men often degenerates to lawlessness and brigandage. In Syracuse, again, there prevails the bright cheerful atmosphere of Greece; and in order to see the life of the Hellenes, still surviving to the present time, we need but visit this district of Sicily and parts of the opposite seaboard. Greece itself has become too depopulated and mixed with too many foreign elements to have preserved much of its former social aspect.

In general the Sicilian is very excitable and passionate, generous, and full of appreciation of the noble and the beautiful, the affections of the heart greatly overbalancing the reasoning faculty in his temperament. He is self-possessed, and it never occurs to him that he is at all

inferior to any one else; hence the confidence and composure in his demeanour towards strangers.[1]

In the large island of Sardinia, whose inhabitants are still but partly civilised, speaking a dialect peculiar to themselves, and possessing no industries and but little trade, there are only two places deserving of mention—the capital, Cagliari (39,000 inhabitants) on the south-east coast, with a safe harbour and naval station, a university, and most of the commerce of the island; on the north coast Sassari, with a population of 36,000.

A few words must be added regarding the little republic of San Marino, which, though completely surrounded by, is still independent of, the kingdom of Italy. This is probably one of the happiest spots on the globe, lying between the Italian provinces of Forli and Pesaro on Monte Titano, a spur of the Apennines. Its population numbers about 8000, and upwards of 3000 of these are landed proprietors. Here there are no sanguinary revolutions or political troubles of any sort. Everything is transacted peacefully and quietly, nor has the independence of the little State been seriously endangered, either by the Popes, in whose dominions it was formerly situated, or by Napoleon I., any more than by the kingdom of Italy after its consolidation. The schools are well managed, and of the natural products much is exported, including cattle, wine, and corn.

The little town of San Marino itself, perched on the crest of Monte Titano, has a population of about 1500, three forts, a monastery (round which gathered the original nucleus of the State), a nunnery, with seven churches, in one of which are the relics of St. Marinus, and a theatre capable of holding an audience of 600.

South of Italy lie the islands of Malta, Gozo, and

[1] Ernest Renan, in *Revue des deux Mondes* for November 15, 1875, pp. 247, 248.

Cumino, inhabited by an Italian population, though belonging, since 1800, politically to Britain. The population is very dense, upwards of 1000 to the square mile, not including the military, and hence the people are necessarily very industrious, carefully cultivating the scanty soil in the face of great natural disadvantages. Cotton is largely grown, and a species of clover (*Hedysarum coronarium*) is remarkably luxuriant. Cereals, potatoes, and numerous fruits, including the well-known "mandarin oranges," are cultivated; but almost the only tree in Malta is the carob or locust tree (*Ceratonia siliqua*), the fruit of which is largely eaten by cattle. The rainfall in the island is about 20 inches per annum. The capital of Malta is Valetta; of Gozo, Rabato. To the west of Valetta is the Porto de San Paolo, the traditional scene of St. Paul's shipwreck.

CHAPTER XIV.

SERVIA AND MONTENEGRO.

1. *People of Servia.*

SERVIA, which is about two-thirds as large as Scotland, is almost everywhere hilly or mountainous. The valleys, however, are very fertile, and the slopes well wooded, yet the land is, on the whole, comparatively thinly peopled. The inhabitants, though belonging with few exceptions to the Orthodox Greek Church, are of three distinct races—the Serb, Bulgarian, and Roumanian, without reckoning the Jews and Gipsies. By far the most numerous is naturally the Serb element, which prevails also in Dalmatia, Herzegovina, Montenegro, and Bosnia. In Servia itself, however, it is found pure in the western circles only, as far as the Morava, beyond which river the farther east we go the more it becomes supplanted by the Bulgarian and Roumanian nationalities.

The Serbs are a primitive Slavonic people, with a decided poetic cast in their temperament, who still sing the warlike deeds of their forefathers to the accompaniment of their monotonous national instruments. They are generally tall and slim, with a vigorous muscular development, and noble and regular features. The men have a proud, martial bearing, and wear an Oriental costume, consisting of wide breeches fastened above the knee, a richly embroidered jacket, and a fez with a tassel, though in Belgrade and other large towns they have now mostly

adopted the ordinary European dress. The women also are mostly well formed, with slender figures and noble expression of countenance, showing in their demeanour a grand and dignified air. Like the men, they still retain their national dress in the rural districts only, with the exception of the married women, who everywhere mostly wear the red fez, round which the hair is gracefully wound.

The Servians are attached to their religion, and are of very temperate habits, a drunken Servian being an extremely rare sight. Like other Oriental peoples, they are hospitable, courteous, and obliging, especially to strangers. They are, on the other hand, said to be somewhat indolent, raising from the soil just enough to live upon, and no more.

The Bulgarians in Servia are estimated at about 100,000, and the Roumanians at 175,000, both chiefly in the eastern districts. Here, as elsewhere, the Roumanians are distinguished from their neighbours by a more regular and finer cast of countenance, and the Servian Roumanians are moreover industrious, thrifty, and strongly attached to their national speech and costume. They have, relatively to their numbers, about twice as many schools and churches as the Servians, but instruction is imparted exclusively in Serb, the law here recognising no other nationality except the Servian. Yet so far from becoming absorbed by the Serbs, the Roumanians rather tend to increase and absorb their neighbours. Amongst the Roumanians may also be included the so-called Zinzars, or Kutzo-Walachians, who play the same part in Servia that the Jews do in many Hungarian and Polish villages. They number from 20,000 to 25,000, while the Gipsies are reckoned at 25,000 to 30,000. All these Gipsies lead settled lives, and there here exist purely Gipsy villages, though of a very wretched descrip-

tion. One of their chief occupations is brick-burning. There are, on the other hand, no more than 1500 Jews in Servia, and as the right of settling in the country or even trading, except in Belgrade, is legally withheld from them, they are prevented from increasing. They are directly descended from the Spanish Jews who took refuge here from the Inquisition, and still speak Spanish.

2. *Pursuits of the People: Agriculture—Stock-Breeding.*

In Servia there is almost a total absence of manufacturing industries, the people being occupied almost exclusively with agriculture and stock-breeding, and even these pursuits are conducted in a somewhat primitive fashion. There are no large landed proprietors, and the whole soil is parcelled out into innumerable little plots amongst the peasantry; and as none of these small farmers possess intelligence or capital enough to introduce any modern improvements, tillage remains much in the same state as it was hundreds of years ago. Other causes of the backward state of the people are the want of great highways of communication, the system of imposts—there being no land-tax in Servia, or any register for land-surveying—the great number of feasts and holidays, the general low state of culture, and the dislike of hard work so characteristic of the Serb race. The consequence of all this is that half of the arable land lies fallow, while the rest is very indifferently cultivated. On the other hand, grazing is carried on more successfully, a pastoral life, as the freest and least laborious, being most congenial to the Serb character. Pig-breeding, especially, is conducted in a very large way, and the export trade in these animals constitutes the main wealth of the land.

Coal is worked at Maidenpek, Krupanye, and Rostoletz, while lignite workings exist at Kostalatz.

3. *Education—Chief Towns—Government.*

As might be expected from the scarcity of the population, the towns are of small size, and thinly scattered over the land. The villages consist mostly of one-storied mud huts, whose fittings and furniture seldom exceed the requirements of a shepherd's family. At the same time all the larger villages have, if not a church, at least a school, conducted by a pupil-teacher carefully selected and paid by the State. The attention given to public instruction is extended to the higher branches also, and Belgrade now boasts of an academy in which all departments of science and letters are represented. This academy enjoys so high a reputation that it is frequented by many foreign as well as native students, and besides it there are several other efficient educational establishments founded by the State, notably a ladies' college in Belgrade, unequalled by any similar institution even in Germany or Switzerland.

The larger townships, amongst which the most important are the two capitals, Belgrade and Kraguyévach, have a certain civilised aspect, and Belgrade especially, has already assumed quite a modern appearance. It is a fortified town, conveniently situated at the confluence of the Save and Danube, and with a population of 30,000. All that now remains of the former Turkish rule are a few Mohammedan houses, and the mosque with its tall, slender minaret.

Since the treaty of Berlin in 1878 Servia has been an independent State, at first a principality, but since 1882 a kingdom. The legislative authority is vested along with the king in a national assembly called the Skupshtina, three-fourths of the members of which are elected by the people, while the remaining fourth are nominated by the king.

The military system is substantially a copy of that of Switzerland. Every man capable of bearing arms is *ipso facto* a soldier, and every one provides for his own uniform and equipments, as far as all personal matters are concerned.

NATIVE OF MONTENEGRO.

4. *Montenegro.*

The little principality of Czernagora or Montenegro (Black Mountain) has an extent of no more than 3500 square miles, and, till the date of the treaty of Berlin, was entirely an inland State. By that treaty, however, it

acquired a small strip of coast, with the coast towns of Antivari and Dulcigno. The same treaty made it absolutely independent of Turkey, to which it had been tributary. The prince, in whom was formerly united the ecclesiastical dignity of the Vladika, rules jointly with a state-council of eight members, four elected, four nominated by the prince.

The Montenegrins are of Serb stock, but in all social respects far less advanced than their Servian kinsmen. They are extremely superstitious, still believing in ghosts, vampires, witches, wind and water spirits, etc. They are distinguished by their warlike character, but also for their cruelty, acquired during the long wars they have successfully waged against the Turks for many generations. There is scarcely any trade in the country, which produces next to nothing, so that all the wants of the people are supplied by the neighbouring Dalmatia. The only town worth naming is Cettinye, the capital and residence of the prince, approached from Cattaro by an extremely difficult road.

CHAPTER XV.

ROUMANIA.

1. *Natural Resources and Aspect of the Country.*

THIS Carpathian region, belonging geographically altogether to Central Europe, consists of the united Danubian principalities of Moldavia and Walachia. At the head of the State is a hereditary ruler now bearing the title of king, and with him is associated in the work of legislation a parliament of two chambers, both of which are elective. The complete independence of this State dates from the treaty of Berlin.

The Carpathians, which bound Roumania on the north and west, determine the character of the land, in which may clearly be distinguished a highland, a hilly central, and a lowland region. The highlands with their crags and virgin forests are rich in game and in timber; probably they also possess much mineral wealth. But all these treasures lie on and beneath the earth in very inaccessible places, are but little known, and have hitherto scarcely been touched by the hand of man.

The hilly central districts support on their rich pasturages countless herds, whose flesh, however, scarcely comes within the reach of the natives, and whose hides are prepared and dressed more skilfully abroad than on the spot. Vines yielding generous fiery wines grow profusely, but are indolently cultivated.

The southern lowlands form one of the great granaries

of Europe, producing maize, wheat, and all other cereals, and green crops in endless profusion. Magnificent fruits also flourish here, but in smaller quantities, because their cultivation needs care, patience, and skill.

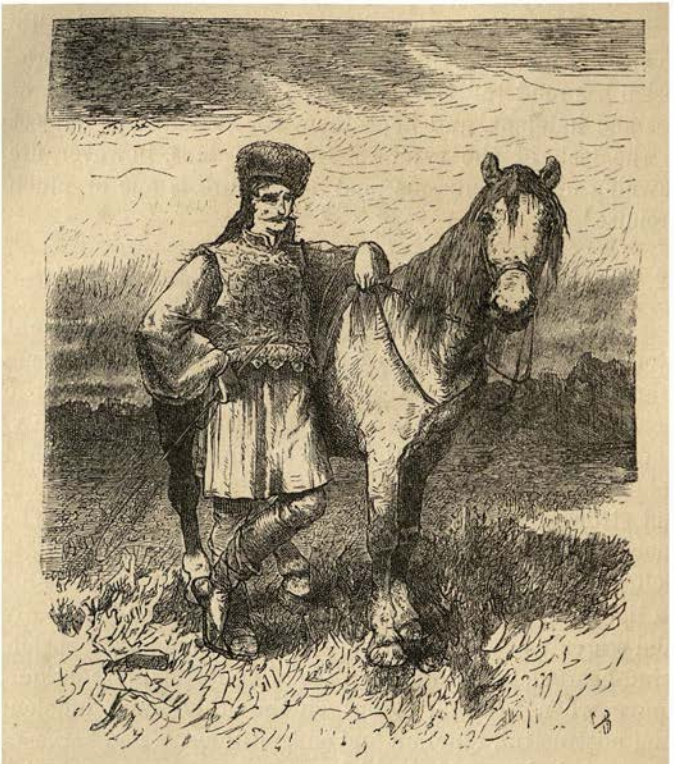
Such are the treasures that nature has lavished with no sparing hand on the Roumanians. But this very profusion has rendered the people themselves somewhat careless and indolent, and kept them for generations subject to the lash of the tyrant. Brighter days, however, are dawning upon Roumania, and her future is one of much promise.[1]

2. *People—Ethnography—Social Condition and Habits.*

The Roumanians, whose assumed descent from the old Roman colonists of Dacia has recently given rise to some warm controversy (see APPENDIX, p. 564), speak a language belonging to the Romance or Neo-Latin linguistic family, and are adherents of the Greek Church. They are of middle stature, often even below the average height, thin, but strongly built, with a southern cast of features. The men are a handsome race, with dazzling white teeth, delicate hands and feet, full of grace in their gait, nimble as lightning in their movements, troubled with few bodily and scarcely any intellectual wants, quick of apprehension, kind-hearted, hospitable, capable of enduring great fatigue, brave when necessary; but, on the other hand, indolent and mistrustful, ignorant and superstitious. Bad harvests, protracted droughts, and devastating murrains, are still attributed to the envy of the unseen powers of nature, or to the anger of some offended popular patron saint. About three-fourths of the whole population still belong to the peasant class.

[1] The improved position of Roumania since the Russo-Turkish war is well described in Mr. James Samuelson's *Roumania, Past and Present.* Longmans, 1882.

In the plains bordering on the Danube the habitations of the peasantry are of a very primitive character. Except when warned by the smoke or the yelping of



WALACHIAN.

mongrels that he is approaching a village, even the eye of the experienced traveller will often fail to recognise it till close at hand. This is owing to the peculiar construction of the houses, or rather mud hovels, which lie deep in the ground, with little windows almost on a level with

the roadway, and conical roofs thatched with straw or maize, partly weather-worn and overgrown with moss. When the highway runs through the village the entrance is often barred by a movable plank, which is freely

WALACHIAN WOMAN.

opened by strolling beggars and naked or ragged Gipsy children. The great bulk of the inhabitants live in such wretched cabins, which usually contain only two large rooms, one of which serves as the bedroom, sitting-room, and kitchen for the whole household, including all manner of smaller domestic animals, while the other contains the

provisions, fuel, and fodder. We seldom meet with kitchen, or even flower and fruit gardens with their shady foliage, nothing except perhaps a few damson trees, which need but little care, and from which is extracted the favourite *tchuka*. But farther inland, away from the Danubian plains, the villages improve, and the houses of the peasantry are not without signs of comfort and prosperity.

The Roumanian develops and decays prematurely; hence early marriages are the rule. These are usually blessed with a numerous offspring, but most of the children fail to reach their tenth year. Between her twenty-fifth and thirtieth year the Roumanian woman becomes wrinkled and decrepit, for she is little better than a beast of burden, while her lord spends his time in idleness. A young woman of eighteen may often be seen with a child on her back, another at the breast, and a third holding on by her skirt, as she trudges to the field, balancing a load on her head and a small distaff in her hand. Her costume is recognised by its long skirt, the absence of a gown, a large apron before and behind, and a picturesque cloth wrapped round her head.

The method of tilling the land, and the agricultural implements and utensils of every sort are still of a very primitive character, and calculated to produce the least return for the greatest expenditure of manual labour. Here and there, however, some few intelligent and substantial farmers have introduced sundry improvements. The peasantry suffer also from the great number of church feasts, the observance of which seriously affects their temporal, without perhaps much improving their spiritual welfare. Still in years of good harvests the amount of wealth poured into the country is extraordinary. Everybody, even the poorest, then enjoys a certain superfluity, the people heedlessly reap the benefit of their good luck,

and in the midst of sudden abundance soon forget their past sufferings. The upper classes are seized with an irresistible desire to travel abroad; they cross the borders in thousands, and the more frequented watering-places, the elegant warehouses of Paris and Vienna, reap a large share of the profits, thus draining the country of its ready money, and preventing the accumulation of capital. The diet of the people is mainly vegetarian, consisting chiefly of maize, which is prepared in a variety of ways. The national dish is the so-called *mamaliga*—a sort of maize porridge, and the favourite drink the *tchuka*—a distillation from the damson. Next in importance to maize as articles of food are the green crops, milk, eggs, and lastly, flesh, especially pork and bacon.

Prominent amongst the national amusements are music and dancing, and the sorriest fiddler may always be depended upon to bring the whole village on its legs in a moment. The music, however, is generally plaintive, and the national dance, called the "Hora," is in like manner suggestive of the former conquered condition of the Roumanians. A few handicrafts, especially spinning, are practised, and nearly all the materials for the graceful national costumes are woven in the country. Unfortunately the men are addicted to the vice of intemperance, and given to sanguinary brawls. Murder and cattle-lifting form the leading crimes amongst the rural population, whose mental culture is in a very neglected state. There are several salt mines in the country, but these are worked by convicts.

There can be no doubt that trade would be greatly increased were the means of transit more numerous or better kept. In the whole land there is scarcely a single highway efficiently maintained throughout its entire length. After a long spell of dry weather we may cross the open country by the narrow beaten paths and high-

ways, if not too susceptible to the dense clouds of dust. But as soon as a heavy downpour has filled the water-courses, burns, and rivers, converting the rich loam into a vast quagmire, all locomotion, even for the shortest distance, is arrested. Recently, however, several lines of railway have been opened, supplying a partial remedy to these evils.

3. *Chief Towns.*

Throughout the whole extent of the land, from Turn-Severin to its delta, the Danube, separating Roumania from Turkey, forms one of the most convenient commercial highways in Europe. On its banks are situated some of the busiest trading places in the south. Such are Galatz, a town with a population of 80,000, between the mouths of the Sereth and Pruth, exporting, besides cereals, timber, salt, wool, and petroleum; Braila (26,000 inhabitants), the chief port in Walachia, and a centre of the corn trade; lastly, Giurgevo, connected commercially with all the principal emporiums of the Continent.

Jassy (90,000 inhabitants, of whom one-third are Jews), capital of Moldavia, and Bucarest (200,000 inhabitants), on the Dambovitza, capital of Walachia, and now of all Roumania. This university town is a place distinguished at once by its refined luxury and terrible filth, a place altogether of violent contrasts,—with the most wretched hovels in immediate contact with magnificent palaces, unpaved streets with 10,000 equipages and 30,000 carriages and saddle horses. Here the civilised west is seen enveloped as it were in an eastern atmosphere. Almost in the centre is the commercial quarter, with its four main thoroughfares, the theatre, palaces of the nobles, grand warehouses, and cafés in abundance. Here we are still in a European world, and surrounded by houses and buildings often presenting a

stately appearance. But outside this district we at once feel ourselves in Walachia—hovels and houses jostling each other without system or order, and the whole more like a series of hamlets and villages connected together by a number of highways than a large city in the ordinary sense of the word.

The "Asyle Hélène" is an admirable educational establishment for girls, and there is also in Bucarest a German "Realschule." Notwithstanding the existence of the University, the well-to-do Roumanians generally send their children abroad, especially to Paris, for the completion of their education.

CHAPTER XVI.

THE KINGDOM OF GREECE.

1. *People—The Hellenic Race and Language.*

AFTER having long languished under the Turkish yoke, this classic land secured its independence by a hard and protracted struggle for freedom, and within the last few years it has had its area extended by the same treaty which secured complete independence for Roumania, Servia, and Montenegro.

The special political importance of this little kingdom lies in the fact that the Hellenic race and language are spread over the whole of the Levant, and more particularly throughout the frontier provinces of Turkey as far as Constantinople.

As to the Hellenic race, however, it must be borne in mind that it is not co-extensive with the Hellenic language. The purity of the race was long ago destroyed by Slavonic admixture, though it is still a question—one which there is probably now no means of settling—how far this Slavonising process went (see APPENDIX, p. 567). But whatever the truth may be as to the race, the Greek language still remained dominant. Miklosich has shown that the modern Greek tongue betrays no Slavonic influences, while others have proved that the pagan elements in the Greek form of Christianity—demons, giants, genii, views of life and death, and the like—are derived from old classic times; in a word, that the old Hellenic world still survives

in the speech, usages, and belief of the modern Greeks. The Slavs settled in Greece have, in fact, not absorbed the Greeks, but have been Hellenised by them. But here, as elsewhere, much of the foreign element has passed over to the ruling race, and traces of blood admixture are unmistakable amongst the Greeks. Though the Greek type, especially amongst the women, has not been effaced, still it has often degenerated. Still more obvious are the Slav influences in the social habits, dress, pastoral and warlike practices of the modern Hellenes.

On the other hand, the admixture of Albanian blood can in no way affect the question, because the Albanians or Skipetari themselves are almost unquestionably descended from an old Hellenic stock, and consequently, in some respects, are more Greek than the Greeks themselves. As might, however, be expected, the purest and most unmixed of all the Greeks are those living apart in the islands.

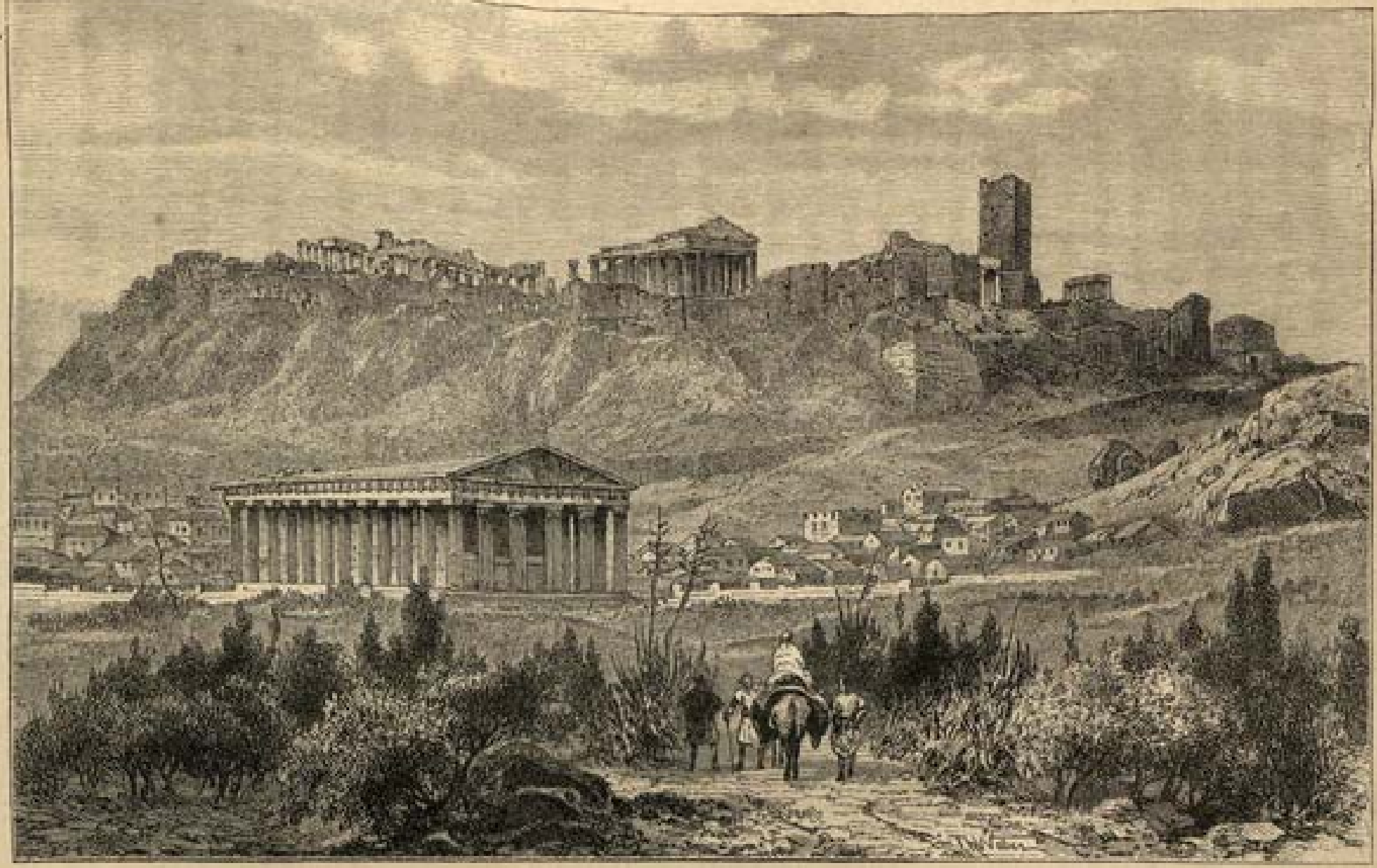
2. *Administrative Divisions—Athens.*

The kingdom of Greece is divided into nomarchies or circles, and these again into eparchies. The whole may be disposed in four groups, the first comprising the mainland north of the isthmus of Corinth, including the nomarchies of Bœotia and Attica, with the islands of Salamis and Egina, and those of Phthiotis, Phokis, Akarnania, and Ætolia, together with the portions of Thessaly and Epirus recently acquired from Turkey. In this division lies Athens, capital of the kingdom, connected with the neighbouring port of Piræus by means of a railway, the journey being accomplished in twenty minutes.

Athens, with a present population of 67,000, a university and other learned institutions, must ever be

regarded as one of the cradles of human culture, consequently possessing an undying interest, however unfavourably the present may compare with the glorious past. Here are still many remains of antiquity, conspicuous amongst which are the Parthenon and the Propylæa crowning the Acropolis, with the temple of Theseus at its foot. Approached from the sea, the city and its surroundings still present a marvellous sight, the marble pillars of the Parthenon sparkling in the sunshine, as if in rivalry with the snowy crest of the distant but still visible Parnassus. Here we begin to understand why and how Athens in former days swayed the sceptre of the seas, and why her power and splendour—in the face of Corinth, Argos, and Epidaurus—must have inflamed the jealousy of the sister states. Before reaching Salamis or Egina we command a prospect of the west coast of Attica in its entire length, as far as the dazzling white cliffs of Sunium, Athens itself appearing as if encircled in a chain of hills—the heights of the Acropolis in the foreground, Mount Lycabettus in the mid distance, and in the background the loftier summits of Hymettus on the right, Parnes to the left, and Pentelicus in the centre. The relative altitude of these chains can be estimated at this distance far better than from Athens itself. Nor from any other point does the temple of Athene produce such an overpowering effect on the imagination as here; for, although no other structure can be detected, the very pillars of this imposing edifice may be counted as they shimmer in the sun.

As we draw near the Piræus the panorama changes. Here the grand proportions of Pentelicus and Parnes, in spring still deeply covered with snow, retreat before the lower but more advanced hills, and presently Hymettus alone remains in view. Athens, and even the Acropolis, have now disappeared from sight, and when we reach the



THE ACROPOLIS AT ATHENS.

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capital by train from the Piræus, we find the modern city absolutely devoid of all characteristic features. The oldest quarter, now little more than an Albanian village, with a dirty bazaar and vegetable market, still retains some traces of a third-rate eastern country town. Adjoining it, however, is a somewhat better constructed district, presenting all the outward appearance of some half-German half-Slavonic town in Poland, or the Baltic provinces. This quarter is enclosed by a third and newer district, with broad streets and boulevards planted with trees, pretentious but far from handsome villas, and a number of public buildings, including the royal palace, museum, polytechnic, house of deputies, ladies' seminaries, barracks, etc.

The only other noteworthy places in this first division are Thiva (Thebes) in Bœotia with 4000 inhabitants; Livadia, in the neighbourhood of the shallow and marshy Lake Topolias; the fortress of Missolonghi in Ætolia, where Byron breathed his last; and the village of Kastri, representing the ancient Delphi.

3. *The Morea.*

The second division is that of the Morea or Peloponnesus, comprising the districts of Argolis and Korinth (with the islands of Hydra, Cerigo, and Spezzia), Achaia and Elis, Arcadia, Messenia, and Laconia. Amongst other peoples here dwell the Tsakonians, whose speech is a continuation and modification of the old Doric of Laconia, affected by the continually increasing influence of the general language and a few foreign words.

In the Peloponnesus the most important places are—Nauplia (6000 inhabitants); Corinth (4000 inhabitants), on the isthmus of like name; Mycenæ, whose fame has been recently revived by the discoveries of Dr. Schliemann;

Tripolitza, capital of Arcadia; and the village of Mistra, close to the ruins of Sparta. In Elis are the ruins of Olympia on the Alphæus, where the explorations carried on by the Germans between 1875 and 1881 have disclosed to view the whole arrangement of the Altis or sacred grove, with the remains of the temples of Zeus, Hera, and the mother of the gods, and have also led to the discovery of innumerable relics of ancient art of greater or less interest. In Achaia, and on the Gulf of Corinth, lies Patras, with a population of 27,000, and at present the most important town and seaport in Peloponnesus.

4. *The Ægean and Ionian Islands.*

The third and fourth divisions consist of the islands in the east and west. They are, generally speaking, more densely peopled, and drive a more flourishing trade than the mainland. In the first group are Eubœa or Negropont, with the northern Sporades, and the Cyclades, which form a nomarchy apart. In Eubœa the chief town is Chalkis, connected by a bridge with the mainland. Of the northern Sporades the most important is Skyros, with the town of like name; and of the Cyclades the most flourishing is the little island of Syra, with its capital, the thriving seaport of Hermopolis (21,000 inhabitants).

The western group comprises the seven Ionian Islands: Corfu, Paxo, Sta. Maura, Thiaki (Ithaca), Cephalonia, Zante (Zakynthus), and Cerigo, which last lies at the southernmost point of the Morea, and belongs to the nomarchy of Argolis and Korinth. In this archipelago Corfu takes the same position that Syra does amongst the Cyclades. Its picturesquely-situated capital of like name has a population (including Manduchio and Castrades) of 24,000, and is a convenient place for the traveller to

prepare himself for a visit to the Hellenic mainland. The island was long under the dominion of Venice, and most of the people still speak, or at least understand, Italian. In 1815 a treaty was signed at Paris whereby the Ionian Islands were placed under the exclusive protectorate of England, thanks to whose administration they have become more civilised and enlightened than the rest of Greece. In 1864 England consented to renounce the protectorate, and the islands were annexed to the Hellenic Kingdom.

5. *Products—Trade—Social Culture.*

Though enjoying a magnificent climate, and in many places blessed with a fertile soil, the southern portion of Greece is too mountainous, and hence also too ill supplied with means of communication, to admit of a great development of agriculture and trade, and it was not till the rich province of Thessaly was added to the kingdom by the treaty of Berlin that Greece was able to supply its own wants in grain. The chief wealth of Greece derived from the soil consists in its southern fruits, including olives. Figs and lemons are important articles of export, and so also are the small dried grapes known as "currants," a corrupted form of "Corinths," a name given to them from one of their places of export. Cotton is grown on the plains of Livadia, in Thessaly, and on other parts of the mainland, as well as on some of the islands. The foreign commerce of the country is very considerable, and the Greeks are, beyond comparison, the most sea-faring people on the Mediterranean. Though still in a very backward condition, the country has made enormous strides in almost every direction since the constitution of the kingdom, little more than half a century ago.

The Greeks have generally a decided appreciation of

the family life, and are usually good sons and brothers. They also display an extraordinary passion for learning. The state system of education, organised by George Gennadios in 1834, comprises three grades of schools, the lowest of which must be attended by all children between five and twelve. The gymnasia, or schools of the highest grade, are said to correspond in the range and standard of the teaching to the gymnasia of Germany. Hence, notwithstanding the undeveloped state of the country, and the brigandage still lingering in some remote districts, Diefenbach has not hesitated to say that the Greeks are the most cultured people of the Balkan peninsula.[1]

[1] Lorenz Diefenbach, *Die Völkerstämme der europäischen Türkei*, Frankfort-on-the-Main, 1877.

CHAPTER XVII.

TURKEY IN EUROPE.

1. *Government—Official Rank in Turkey—Ulemas and Softas—Army.*

THE part of the Balkan peninsula described as Turkey in Europe, or simply Turkey, is but a portion of the vast Ottoman Empire, which extends over all Asia Minor, Kurdistan, Mesopotamia, Syria, Palestine, part of Armenia, and nearly the whole of the west coast of Arabia, and includes also the vassal States of Egypt, Tripoli, and Tunis in Africa, though the "Sublime Porte," as the Turkish imperial government is called, exercises but little influence over them.

But of all these various regions European Turkey proper is so far the most important portion of the Empire, that through it alone the Porte constitutes a leading factor in the politics of Europe. In this division also, though close to the shores of Asia, lies Stamboul, or Constantinople, the much-coveted capital of the State.

Though in 1876 an abortive attempt was made to give to Turkey a representative form of government, this State is still an absolute monarchy, in the very strictest sense of the term. From the very first the Ottoman government was essentially based on the theocratic and military idea, and the successors of Osman (Othman I.) were the commanders-in-chief and foremost champions of Islam. By succeeding to the Califate—that is, to the

succession of the Prophet—the sultans further became the high-priests and supreme judges of the Faithful. These functions they exercised vicariously, just as their political and military offices were practically fulfilled by their viziers and sirdars. The Grand Sultan, or Padishah, is the supreme head of the State, and under him are the Grand Vizier, or Prime Minister, and all the other viziers. There are further the Divan, or Imperial Council, and the Ulemas, with the Sheikh-ul-Islam at their head, whose proper function it is to interpret the laws and the Koran. At the head of each of the Vilayets, or Eyalets (provinces, or administrative departments), into which European Turkey is divided, is a Vali, subject to removal at the arbitrary will of the Porte.

The Turks differ so far from the Arabs that they attach no importance to pedigree, nor has their political or social system ever recognised any castes or hereditary nobility; nothing, in fact, beyond official rank. Hence every private citizen may reach the highest offices of State, and it often happens that the dignities of generalissimo or Grand Vizier are filled by statesmen or soldiers sprung from the lowest ranks of society. The Sultans themselves may be the children of slaves raised by the birth of a son to the rank of a Sultana. Hence, the honourable position held generally in Turkey by the serving classes, the servant in the Osmanli's household being still regarded and treated as a sort of member of the family.

In the Turkish system of government a remarkable position is occupied by the Ulemas, who, though strictly belonging to the hierarchy, no more form an exclusive body in the State than does the army. Both constitute an essential element in the Mussulman community, as the Koran is at once the book of religious revelation and the civil code, and as the Sultan himself is in his own person

political ruler and supreme protector of the faith. Of the Ulemas there are two categories, the *fonkehas* or jurists, and the Ulemas proper, or expounders of the Koran. The hierarchy likewise includes the *Mollahs* and *Kadis* (judges and magistrates), the *Muftis* (theologians), *Muderris* (professors), and the *Khatybs*, *Imams*, *Muezzins*, and *Kayms* (ministers of worship), these being again subdivided into various other classes and orders. A clergy in the Christian sense does not exist, nor can the *imam*, for instance, be in any sense compared with the Christian minister. The Moslems are educated as Ulemas in the *Medressé*, or theological schools, the most noted of which are those of Stamboul and Adrianople in Europe, and Brussa in Asia Minor. The students in these *medressé* are called *Softas*.

The Turkish army is recruited chiefly amongst the Mohammedan populations of Anatolia, or Asia Minor, the Christians and Jews, as well as the inhabitants of Constantinople, having hitherto been exempt from military service. The recruiting is conducted by lot, which often deprives a family of its only son and bread-winner. The infantry, in a sort of Zouave uniform, and armed with the best modern weapons, presents a harmonious and martial appearance. It is distinguished by a natural taste for arms, a spirit of obedience to orders, rendering unnecessary all severe measures for the enforcement of discipline, a fearless devotion and resignation, a stoical power of endurance and indifference to privations, such as can scarcely be elsewhere matched. The weak points of the service are incompetent commanders, badly instructed officers, insufficient training in all branches except the artillery, and defective organisation.

2. *The Osmanli or Turkish Race.*

The Osmanli Turks, so-called after Osman, one of their early leaders, are a branch of the Ural-Altaic or Finno-Tataric race so widely spread over Central Asia. They have been dominant in the south-east of Europe since the fifteenth century, but have never formed a majority of the population, and they do not even do so in what has been left of European Turkey since the re-arrangements brought about by the treaty of Berlin, which withdrew from Turkish rule so many territories in which people of other races greatly preponderated. In the provinces still retained under the immediate government of the Porte the three chief races are Turks, Greeks, and Albanians, which are almost equally numerous, and make up about 70 per cent of the whole population. In the autonomous province of Eastern Roumelia, south of the Balkan range, the census of 1880 showed that the Turks there made up little more than 21 per cent of the population, and in the tributary principality of Bulgaria, north of the Balkans, the census of January 1881 showed that they did not reach 31 per cent in that state. From Bosnia and Herzegovina, which, though now in Austrian occupation, are still held to belong to Turkey, they are altogether absent, the population there being made up almost entirely of Serbs. In general they are most numerous in the provinces bordering on the Black Sea and the Ægean. Moreover, while other races in Turkey hold their ground, or even increase, the Osmanli are not only giving way numerically, but are actually losing their hold on the land. Whatever be the cause, the landed estates are passing out of their hands in an ascending ratio. The decrease in their numbers is explained by their dislike for a large offspring, so that while the Greek

and the Slav families average from five to ten, the Turkish seldom numbers more than two children.

The Turk of the present day is not merely the blind fatalist of former times, though inheriting the belief in *Kismet* or destiny, together with the passive military virtues of his heroic forefathers, virtues which still enable him to offer a most determined front to the attacks of his hereditary foes.

3. *Other Races in European Turkey—Greeks; Albanians; Slavs (Serbs and Bulgarians).*

Confronting the Osmanli in European Turkey are the Greeks, Albanians, Bulgarians, Serbs, and Roumanians, besides some less numerous peoples, such as the Zinzars, akin to the Roumanians, living mostly amidst the Albanians of Thessaly and Epirus; the Armenians, in the towns; Magyars, Gipsies, Jews, Circassians, Russians, Arabs, Poles, and Germans—the three last named in very few numbers.

Of all these races the most important are the Greeks, who form the majority everywhere along the southern sea-board. They are found in compact masses in the provinces on the Ægean and Sea of Marmora, in Crete or Candia, and on the shores of the Euxine, as far east as the Kamchik.

The Albanians, whom the Turks call Arnauts, and who call themselves Skipetari, or mountaineers, belong in all probability to the primitive Græco-Latin stock, and are now generally regarded as the descendants of the old Illyrians. About 70 per cent of them are Mohammedans, and the rest partly Orthodox partly United Greeks. The northern limits of the Albanian territory encircle Montenegro on the south and east, reaching northwards almost to the Morava, and southwards to the frontiers of Greece

But still more important, both socially and numerically, are the south Slavonic Serb and Bulgarian nations. With the exception of a few Bosnian and Bulgarian Mohammedans, the Turkish Slavs are mostly Orthodox Greeks. In Bosnia all the nobility have become Mohammedans in order to preserve their feudal rights, but they still jealously retain their Slavonic nationality and speech. In other respects also they have preserved much of their original Christian character, marrying one wife only, keeping no concubines, allowing greater freedom to the women, and introducing many Christian ceremonies in the celebration of marriages, funerals, and other rites. Amongst the Christian Serbs of Bosnia there are 200,000 members of the Roman Catholic Church.

Of all the south Slavonic nations the Serbs are intellectually the most important. Brave and full of an all-devouring patriotism, they are often on that very account exclusive, rude, and unjust to others. They are an imaginative people, and their popular ballads contain some precious poetic gems. Boasting of a great past, although it ended tragically, the Serbs still sing the brave deeds of their heroic forefathers, and bewail in touching strains the ruin of their national independence.

The next great Slavonic nation in Turkey are the Bulgarians. Though now undoubtedly belonging to this family the Bulgarians were originally an Ugric, if not even a Samoyede, race, who settled amongst the Slavs in the region of the Lower Danube, and became ultimately absorbed by them. The old Bulgarian speech seems to have been already extinct and replaced by the Slavonic in the tenth century, so that nothing but their name has survived to remind them of their former nationality.[1]

The Bulgarians dwell in a compact mass, with but

[1] This subject is treated in a masterly manner by Constantine V. Jirechek in his *Geschichte der Bulgaren*. Prague, 1876.

ROSE-HARVEST IN BULGARIA.

To face page 543.

few alien elements, in the region between the Servian frontier and the Yantra, and on the slopes of the western Balkans. They are also met with west of the Maritza as far as Lake Okhrida, in which district they are more numerous than their Turkish, Greek, and Albanian neighbours. They have, however, been generally kept by the speculative and seafaring Greeks from approaching the coast, which they reach only at the two important ports of Varna and Saloniķa. They have also lost ground during the present century towards the west, where they have been encroached upon by the warlike Albanians. Still more recently the Tatar settlements from the Crimea, and the Circassians from the Caucasus, have made great inroads on Bulgarian domain in the north-east, driving many of them to seek new homes in Hungary, Roumania, Servia, and the Crimea.

The Bulgarians differ from their Serb neighbours in speech, expression of countenance, pursuits, mental qualities, and dress. The Moslem may perhaps surpass the Christian village in outward cleanliness, but in the interior of the court, the greater industry, comfort, and prosperity of the hospitable Bulgarian peasant at once become manifest. It would indeed be difficult to say which of the two sexes excels in perseverance, skill, and love of work. In the Danubian towns the Bulgarian is mostly either a merchant, small dealer, or craftsman, while in the lowlands he is almost exclusively a tiller of the land, though as a rule cultivating little more than is needed to supply his own individual wants. The cultivation of the rose and the preparation of otto or attar of roses constitute an important industry in many parts of Bulgaria. In a few Balkan towns, such as Gabrova, Travna, and Kalofer, certain handicrafts have been considerably developed, and in his partiality for the industries as a means of livelihood the peaceful Bulgarian

compares on the whole to advantage with the more commercial and warlike Serb. He possesses an undeniable aptitude for skilled labour of all sorts, and is not only distinguished by his artistic sense of form and colour, by manual dexterity and industry, but is further endowed with a large share of the constructive faculty, as displayed in his house architecture, and still more in his water-engineering, bridges, and ecclesiastical structures. On this and other grounds Kanitz recognises in the Bulgarians the future industrial and mechanical people of European Turkey.

In his religious views the Bulgarian has not yet got much beyond the old pagan Slavonic traditions and usages. These notions accompany him throughout life, from childhood to the grave, and even beyond it, inasmuch as the old worship of the dead has been displaced by superstitious ceremonials. But as this nation has earnestly set about improving the state of popular education there is reason to hope that more enlightened ideas will find a congenial soil amongst them.

The Pomaci, or Moslem Bulgarians, differ only in a few outward respects from their Christian brethren who have remained faithful adherents of the Orthodox Greek Church, and with whom they lived in perfect harmony before the peace of these peoples was disturbed by the intrigues of Russian propagandists, followed by the presence of devastating Russian armies. Not long since a series of old traditional songs, possessing great poetical merit, was discovered amongst the Pomaci of the Despoto range.[1]

4. *Social Position of the Rayahs.*

The Christian, mainly Slavonic element, has hitherto

[1] *Blgarski narodni Pjesni. Chansons populaires bulgares inédites; publiées et traduits par Auguste Dozon.* Paris, 1875.

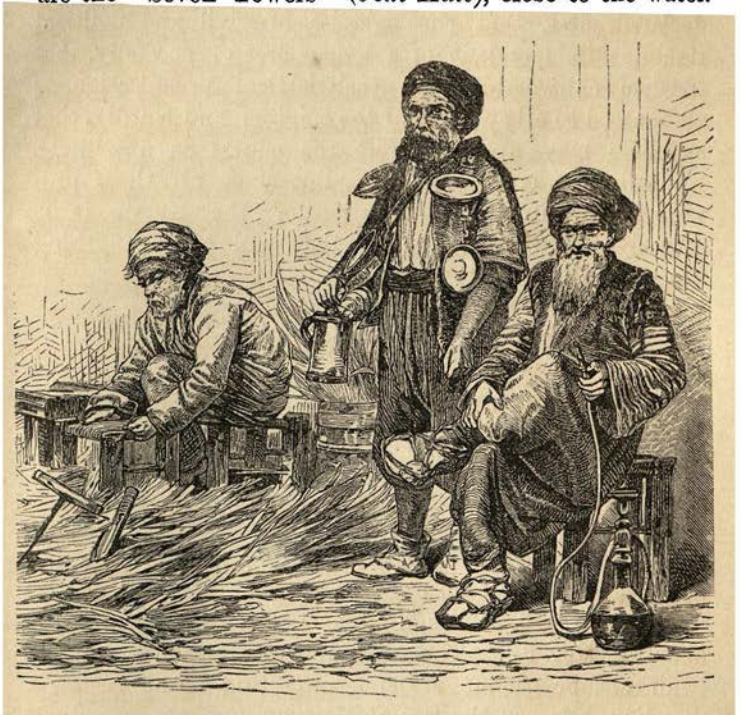
suffered most from Turkish misrule. Of this class are composed the Rayahs, or non-Mohammedan population, who were long deprived of all civil rights. By the 62d article of the Treaty of Berlin a remedy for their grievances is indeed provided. In that article it is declared, first, that the exercise of civil and political rights is independent of religious creed; secondly, that freedom of worship and ecclesiastical organisation is guaranteed to all subjects of the empire; and thirdly, that any one may appear before the courts as a witness, whatever his creed may be. But since all these provisions are in direct violation of the Koran, it is scarcely to be expected that they will prove anything but a dead letter.

5. *Constantinople and other Chief Towns.*

Of all the towns in European Turkey none can for a moment compare in size, commercial importance, or picturesque beauty, with Stamboul or Constantinople,[1] capital of the Empire. Lying on the frontier of two continents, and, like Rome, built on seven hills, Constantinople has a present population of above 500,000; or, including the neighbouring places on either side of the Bosporus, at the utmost 600,000, although often erroneously estimated at about 1,000,000. The city proper forms a triangular peninsula, or tongue of land, projecting, in an easterly direction, between the Sea of Marmora and the so-called port of "the Golden Horn" in the Bosporus. At the extreme point of this peninsula, which bends round a

[1] *Stamboul* is simply the Turkish form of the Greek *Constantinopolis*= city of Constantine, as Byzantium was re-named when that place was chosen as the seat of government by the emperor Constantine the Great in the year 328. The forms *Estamboul* and *Istamboul*, which also occur, probably suggested the derivation of the Turkish word from the Greek expression *εἰς τὴν πόλιν* = *into the city.*—*Trans.*

little to the north, is situated the Seraglio, or imperial palace, and at its entrance, the "High Porte," or palace of the Grand Vizier, as well as the famous church (now mosque) of St. Sophia. Not far from the old city walls are the "Seven Towers" (*Jedi Kale*), close to the water.



TYPES OF THE PEOPLE OF CONSTANTINOPLE.

The wealthiest and most influential Greek families reside in the quarters known as the "Phanar," from its *pharos* or lighthouse, whence also they have themselves received the name of Phanariotes.

At the upper end of the Golden Horn lies the suburb of Eyub, a purely Turkish quarter, in which is the mosque

where the new sultan is solemnly invested with the sword of state. Several bridges lead from the Golden Horn to the suburbs of Galata and Pera, where reside the foreign ambassadors and the Franks, as the Western Europeans are everywhere called in the East. Here also rises the Dolmabagtche palace, close to the Bosporus. On the Asiatic side lies the large town of Üsküdar or Skutari, with a population of 80,000, which is regarded as a suburb of Stamboul, and in which is the summer palace of the Sultan, commanding a superb view of the opposite shore.

The poetical fancies entertained by the western nations with regard to Constantinople have been reduced to their proper worth by more recent and impartial observers. Thus Wilhelm Fr. v. Berg, after repeated visits to the place, was less favourably than ever impressed by its appearance when he last saw it, early in the year 1876. Since the great fire some few streets had been widened, and some respectable edifices run up here and there; a new iron bridge had also been thrown across the Golden Horn, and a tunnel, with a rope railway, opened between Galata and Pera. But the filth was as deep, the pavement as detestable, the lanes and back slums as foul and pestilential, the prowling pariah dogs as numerous, and the people just the same as ever. This motley assembly of nationalities, however interesting to the ethnologist, can never be very agreeable to the European eye.

This description of the condition of the capital is generally still more applicable to the other towns of European Turkey. Of these the most important is Adrianople, the old capital of the State, at the confluence of the Maritza and the Tundja. Although inhabited by some 100,000 Turks, Greeks, Bulgarians, and Jews, this town is little more than an overgrown Turkish village. Philippopolis, with a population of 30,000, is the centre of trade in Eastern Roumelia. At Usunjova, midway be-

tween this and the last town, a great fair is held every autumn. On the southern coast are Gallipoli, a naval station of paramount strategical importance on the Dardanelles, and Salonika (Thessalonica) at the head of the gulf of like name in Macedonia. Next to Stamboul this place, which has a population of 60,000 to 80,000, is the most important seaport in all Turkey, and must acquire far greater consequence when the railway is completed that is intended ultimately to connect it through the Vardar Valley and Servia with the Austro-Hungarian system. In Upper Albania the chief town is Skodra or Skutari, close to the large lake of the same name. Mostar may be mentioned as the capital of Herzegovina, and Bosna Serai (50,000 inhabitants) of Bosnia. In the principality of Bulgaria the towns are numerous but all small. At the census of 1881 the only towns with more than 20,000 inhabitants were Sofia, the capital (20,500), Varna (24,600), Sumen (23,000), and Russe (26,000). Along the Danube are a number of fortified towns and ports, including Widdin, Nikopolis, Sistova, Rustchuk, and Silistria, the two last mentioned forming, with Shumla in the interior and Varna on the Euxine, a famous quadrilateral. Lastly, in Crete are Chania or Canea (8000 inhabitants), with the best harbour in the island, and the fortress of Candia (10,000 inhabitants), both on the north coast.

7. *Turkish Culture—Means of Communication—Finance.*

The moral and intellectual state of the people is on a very low level all over Turkey, and all the lower the more predominant is the Osmanli element. Here there is no question of such culture as is understood by our western civilisation, with all its inspiring influences and quickening energies. In Turkey we find nothing but that mockery

of culture which the Turks call reform, and which consists in the adoption of what is merely external and superficial in European civilisation, including, unfortunately, the European vices, while the higher qualities of that civilisation remain unregarded. The education of the people naturally receives little attention. The internal trade is chiefly in the hands of Greeks, Armenians, and Jews, and, as in other countries in which commerce on a great scale is imperfectly developed, depends to a large extent on fairs, such as that of Usunjova above mentioned. Between the periodical fairs the head of the family, whether a peasant or a well-to-do townsman, provides his dependants only with the merest necessaries, requiring them to wait for everything else till the merchants have returned from the fair. The means of communication are very imperfect. Highroads are a rare exception, and by-ways entirely unknown. The railways that have been begun remain uncompleted, none of the lines being yet connected with those of western Europe. There is, however, at last a prospect of this connection being effected, for in 1883 the Turkish government agreed to the union of the Servian and Macedonian lines at Vranja, near the Servian frontier.

The pressure of taxation is almost intolerable for Christian and Moslem alike. Since 1875 the State has been bankrupt, and in August 1881 the administration of the Turkish debt was handed over to a commission representing the creditors, and empowered to receive for this purpose the proceeds of six indirect taxes (on tobacco, salt, spirits, stamps, fisheries, and silk), besides the surplus revenues of Cyprus, the tribute of Bulgaria and Eastern Roumelia, and one or two other minor revenues.

A subsequent decree made provision for a reduction of the nominal capital of the debt, and for the capital-

isation of arrears. Within two years another important step was made in the direction of putting the Turkish finances upon a satisfactory basis. A company was formed to undertake the levying of one of the most lucrative sources of revenue handed over to the commissioners of the debt. This company, which received a formal authorisation from the Turkish government in June 1883, agreed first of all to pay to the commissioners a sum of 750,000 Turkish pounds (equal to about £675,000), while the remainder of the net proceeds was to be divided at a fixed ratio into three shares, one of which was to go to the commissioners, one into the Turkish treasury, and the third to become the property of the shareholders of the company. It is confidently hoped that this measure will lead to the establishment of a favourable balance in the Turkish budget.

LIBRARY OF THE BOMBAY BRANCH OF THE ROYAL ASIATIC SOCIETY.

ARYAN FAMILY.
FINNO-TATAR FAMILY.
BASQUE FAMILY.
EUROPE

LIBRARY OF THE BOMBAY BRANCH OF THE ROYAL ASIATIC SOCIETY.

APPENDIX.

I.—ETHNOLOGY AND PHILOLOGY OF THE EUROPEAN RACES.

By Professor A. H. KEANE.

1. The Earliest Inhabitants of Europe—Men of the Stone Epochs.

Regarded as a geographical unit Europe is little more than a western peninsula of Asia. In its present ethnical constitution it also belongs substantially to that continent. The two fundamental human types conventionally known as the Mongolic and Caucasic are in exclusive possession of both regions, but their relative positions are reversed, the Mongolic largely predominating in Asia, the Caucasic in Europe. Whether this relation always prevailed is a question which cannot be decided until something more definite is known regarding the men of the early Quaternary (Pleistocene) epoch, by whom the greater part of the western continent was first peopled. Of these primeval races nothing has survived apart from their rude and polished stone implements, a few fragments of bones, and more or less perfect skulls, sufficient to determine two or more craniological types, but insufficient to establish their relations to existing stocks. From the localities where the earliest specimens of these extinct races have been found, races contemporary of the rhinoceros, mammoth, cave-bear, and reindeer, they are known as the Cannstadt, Cromagnon, and Furfooz types. The oldest appears to be that represented by the skull found at Cannstadt near Stuttgart in 1700, and examined in 1835 by Fredrich Jäger, who found it to be distinctly dolichocephalous. A blow was thus given to the hitherto accepted theory that the earliest European races were brachycephalous, and consequently Mongolic rather than Caucasic, so far at least as this point could be determined by craniometry. The Cannstadt race, which seems to have flourished during the

early Quaternary epoch, was followed by that of Cromagnon, so called from the remains of an old man found in 1868 at that place in the Vézère valley, Dordogne. This type, now represented by about twenty skulls and a few imperfect skeletons, was also dolichocephalous, though not to the same degree as the previous. It survived far into the Quaternary epoch, disappearing with the reindeer, or giving place to the men of the Neolithic period, typified by the remains discovered in 1866-67 by Dupont in the caves near Furfooz on the right bank of the Lesse in Belgium. Even this race was still somewhat dolichocephalous, although apparently contemporary of a true brachycephalous people, who had already penetrated westwards to the Danube valley, and who are represented by the remains found at Nagy-sap near Gran in Hungary. Possibly the Furfooz race itself may have been related to this round-headed stock, but modified by mixture with the earlier long-headed peoples of Western Europe towards the close of the Quaternary or beginning of the present Geological epoch.

Some of the Paleolithic River-drift men were widely spread, probably even in pre-glacial times,[1] not only throughout Europe, but over a great part of the northern hemisphere from India to North America; and as they were numerous, especially in the Somme, Seine and Thames valleys, in Perigord, Belgium, and West Germany, De Quatrefages conjectures that "representatives of the fossil human types still survive amongst us."[2] Acting on this hint Professor Penka has recently ventured to identify the Cromagnon race with the present dolichocephalous Basques and Berbers of the Pyrenees and North Africa.[3] But although long-headed, the Cromagnon skull was also decidedly prognathous, hence more nearly allied to the Negro or Eskimo than to the Basque and Berber types. More plausible is this writer's view that the short-headed successors of the Cromagnon race were of "Turanian"— that is, Mongolic stock, and that these were followed and subdued but never absorbed by dolichocephalous Aryans from the East. Hence the presence in Southern Europe of a short, dark, round-headed stock collectively known as "Kelts," "Iberians," "Silurians," according to the various theories or fancies of anthropologists. It is noteworthy, however, that in Britain this short dark and earlier race of the long-barrows were long-headed, while the more recent tall and fair men of the round-barrows were brachycephalous.

[1] "I feel inclined to view the River-drift hunter as having invaded Europe in pre-glacial times along with the other living species which then appeared."—Prof. Boyd Dawkins' Address on the "Antiquity of Man" at the British Association, 1882.

[2] *Crania Ethnica*, p. 28. [3] *Origines Ariacæ:* Vienna, 1883.

2. No Pure Races in Modern Europe.

And thus the problem of the true relations of prehistoric man to the present inhabitants of Europe still remains an unsolved riddle. At the dawn of history we find the Continent already peopled, much as it now is, by Finns in the north, by Slavs (Sarmatæ and Scythians) in the east, by Teutons and Kelts in the centre and west, by Iberians, Ligurians, Itali, Siculi, Greeks, Illyrians, and Thracians, along the Mediterranean seaboard. Throughout the historic period down to quite recent times the ethnological evolution has been continued mainly by incessant shiftings and interminglings of these peoples, further complicated by some fresh intrusions of Mongolic and other elements (Phœnicians, Huns, Alans, Ugrians, Arabs, Berbers, Kalmucks, Tatars, Turks, Armenians, Cherkesses) still from Asia, and to a small extent from North Africa. Repeated waves of migration have thus from the remotest ages flowed westwards from the Asiatic steppes, mainly in two great streams round the northern and southern shores of the Euxine, each successive wave producing further disturbing effects by fresh displacements, absorption, or fusion with previous elements. Hence in modern Europe there are no longer any pure racial types to be found, or at all events their claim to unsullied descent from their presumed ancestry can in perhaps no single instance be unhesitatingly accepted. The Aryan stock itself, whatever its original constitution, has everywhere become so intermingled with non-Aryan peoples already in possession of the land that the very expression Aryan has almost lost its ethnical value. So with the Basques of the Western Pyrenees, and the Finns of the north-east, both often supposed to be true aborigines, yet both betraying the presence of at least two distinct elements. Virchow is even inclined to question the unity of any primitive Teutonic type at all. "If the Germanic people had their cradle in the extreme east, it seems to me very probable that from the first, in Asia itself, a certain physical divergence was developed between their various branches living in proximity to each other—a divergence which may have been perpetuated in their new homes. For why should not different types be evolved as well as different forms of speech (High and Low German)?[1] And what is here suggested of the Teutonic is of course equally applicable to the Keltic, Slavic, Hellenic, Italic, and all other divisions of the European populations.

[1] *Beiträge zur physischen Anthropologie der Deutschen:* Berlin, 1876.

3. No Mixed Languages in Modern Europe.

But if there are no longer any pure races, ethnically speaking, in Europe, the European peoples themselves may still be grouped together according to the several forms of speech current amongst them. Arguing from the mixture of races in Hungary, Schwiker, in fact, concludes that "speech remains the most conspicuous distinctive indication of European affinities."[1] De Quatrefages also shrewdly remarks that "had it not been for their special language no one would have hesitated to consider the Basques as belonging to the same family as other southern Europeans."[2] And Sayce observes generally that "the physiological races of the modern world are far more mixed than the languages they speak; the physiologist has much more difficulty in distinguishing his races than has the glottologist in distinguishing his families of speech."[3] This statement is specially applicable to Europe, where we have, for instance, mixed Keltiberian communities, but no mixed Keltiberian languages; Finno-Slavs, Slavo-Teutons, Kelto-Teutons, but no Finno-Slav, Slavo-Teutonic, or Kelto-Teutonic idioms. The inferior, and sometimes even the superior races have in all cases abandoned their national speech, while adopting, without seriously modifying that of the conquerors or conquered, as the case may be. Within two generations the victorious Northmen of the Seine valley completely forgot their Norse tongue, and adopted the Romance of their Gallic subjects. These Gauls themselves had, on the other hand, previously changed their old Keltic speech for the Latin of their Roman masters. In this region of Northern France there have thus arisen racial complexities of all sorts, but never any permanent linguistic confusion, one language simply displacing another without producing any mixed forms of speech, which, if they exist at all, are certainly the rarest of philological phenomena. The Basques of Navarre are at present relinquishing their old Escuara tongue for Spanish, but they do not blend the two into some new Hispano-Basque variety. So also the Pruczi, or "Old Prussians," the Wendish Polabs, the Ugric Bulgarians, many Permian Finns, Kelts of Cumberland, Cornwall and Ireland, have become assimilated in speech to the surrounding Slav and Teutonic populations. Foreign elements have doubtless found their way into the vocabularies of most European tongues, notably into English, Albanian, Turkish, and Roumanian. But all such elements have invariably conformed

[1] *Statistik des Königreichs Ungarn:* Stuttgart, 1877, p. 148.
[2] *The Human Species:* 1879, p. 434.
[3] *Science of Language,* i. p. 366.

to the grammatical forms of these idioms, leaving their inner structure almost absolutely unaffected. Hence although Turkish, for instance, has embodied numerous Arabic and Persian expressions, its mechanism has not become to any appreciable extent either Semitic or Aryan, but still remains almost purely Tataric. English also is mixed, but mixed only in its vocabulary, which is partly Teutonic, partly Italic, while its structure remains what it has ever been, exclusively Teutonic. It was the same doubtless with the Polabish of the Elbe and other now extinct Wendish dialects of Pomerania, Mecklenburg, and Brandenburg, which are said to have become largely "Germanised" before dying out. Germanised they may to some extent have become in their vocabulary, but in their grammar they remained purely Slavonic to the last. The same process is at present going on amongst the Finnish Vepses of Lakes Onega and Ladoga, of whom Ch. de Ujfalvy tells us that they are becoming rapidly Russified in speech while still retaining their distinctive physical features.[1] Here was a peculiarly favourable field for the development of a mixed Russo-Finnic dialect; but here, as elsewhere, the weaker simply yields to the stronger, and no fusion of discordant elements takes place.

4. Comparative Ethnological and Linguistic Table of the European Peoples.

This subject may be further illustrated by the subjoined table of some of the chief European peoples, showing that they all belong ethnically to mixed, but linguistically to unmixed families:—

Peoples.	*Ethnical Group.*	*Linguistic Family.*
English Lowland Scotch	Kelto-Teutonic.	Teutonic.
Welsh	Siluro-Keltic.	Keltic.
Cornish	Siluro-Teuto-Keltic.	Teutonic.
Irish (west)	Siluro-Keltic.	Keltic.
French (south)	Ibero-Keltic.	Italic.
French (north)	Teuto-Keltic.	Italic.
Spaniards	Keltiberian.	Italic.
Italians (north)	Liguro-Kelto-Italic.	Italic.
Italians (south)	Helleno-Italic.	Italic.
Germans (east)	Slavo-Teutonic.	Teutonic.
Germans (south)	Kelto-Teutonic.	Teutonic.
Bohemians	Kelto-Teuto-Slavonic.	Slavonic.

[1] "Les Vêpses disparaissent en prenant la langue Russe, mais ils se conservent fort bien au point de vue anthropologique."—*Bul. d. l. Soc. de Geo.* xiii., 1877, p. 320.

Peoples.	*Ethnical Group.*	*Linguistic Family.*
Great Russians (north)	Finno-Slavonic.	Slavonic.
Bulgarians . .	Ugro-Slavonic.	Slavonic.
Hungarians . .	Ugro-Teuto-Slavonic.	Finnic.
Prussians (east) .	Letto-Teuto-Slavonic.	Teutonic.
Roumanians . .	Italo-Thraco-Illyric.	Italic.
Lithuanians . .	Kelto-Slavonic.[1]	Lettic.

Here we find no compound terms—that is, no mixed elements in the linguistic column, while in the ethnical all the terms are compound. So true it is that the French, the English, the Germans, the Russians, the Hungarians, are peoples, not races,—in fact, that "there are no pure races, that all are crossed" (Gerdy). It should also be noted that while there is no doubt as to the correctness of the linguistic, that of the ethnical grouping is largely conjectural, and often rather suggestive than final. Hence it is that the attempt to classify the present inhabitants of Europe resolves itself largely into a classification of their languages, and such a grouping can of course possess only a certain limited ethnical value. For it cannot be too often repeated that speech and race are not necessarily convertible terms. It does not follow, for instance, that all the present Aryan-speaking peoples of Europe are pure Aryans by descent, or even Aryans at all. And speaking generally, the present ethnical conditions of Europe are a continuous illustration of the fundamental truth that "the evidence of language can never guide us to any positive conclusion respecting the specific unity or diversity of human races."[2]

On the other hand, it may be admitted that the great linguistic families of Europe—Aryan and Finno-Tatar—correspond, on the whole, with the racial affinities of the peoples comprised within them. There are doubtless some Aryan communities that have shifted their place within the Aryan group itself; Kelts, for instance, who now speak Teutonic or Italic tongues; Slavs, who have become Germanised, and so on. But the great bulk of the Aryan-speaking peoples are Aryans also by descent, although no longer free from a certain admixture of foreign blood. In the same way the peoples of Finno-Tatar speech are mainly of Finno-Tatar stock, though more or less affected by Aryan and other ethnical elements. It is this consideration which lends its special value to the linguistic classification here adopted, and which to some extent justifies the statement of Waitz that "for the classification of man-

[1] So at least a writer in Petermann's *Mittheilungen:* "Die Lithauischen Völker die aus einer Mischung Slavischer und Celtischer Stämme hervorgegangen sind," No. 77, 1877, p. 7.

[2] W. D. Whitney, *Language and the Study of Language*, p. 394.

kind philological research has given much more certain and harmonious results than the physical study of man."[1]

5. The Great European Families—The Aryans.

Apart from the Semitic Jews and a few recent Circassian immigrants from Caucasia, all the present inhabitants of Europe belong exclusively to three linguistic families—the Aryan (Indo-European), the Finno-Tataric (Uralo-Altaic), and the Basque (Iberian). But these three groups divide the continent very unequally between them, the Basques being confined to a corner of the Western Pyrenees, the Finno-Tatars to parts of Hungary and Turkey, besides some thinly-peopled tracts of Russia and Scandinavia, while all the rest is occupied by Aryan-speaking peoples. In fact, when we consider the immense social and intellectual, no less that the numerical and political, predominance of this group, Europe may be regarded as practically an Aryan domain.

Yet the Aryans themselves seem, like all the other inhabitants of Europe, to be of Asiatic origin. This conclusion has doubtless been questioned first by Latham, who points to Lithuania, and more recently by Penka[2] and Schrader,[3] who suggest Scandinavia and the Baltic regions as the probable centres of dispersion. But their theories, based largely on linguistic arguments,[4] are only less fanciful than the curious hypothesis of Poesche,[5] that the Aryans were originally differentiated by a process of Albinoism in the marshy lands of White Russia about the water-parting midway between the Euxine and Baltic. The question, which probably no longer admits of complete solution, cannot here be discussed. But it may be pointed out that morbid affections due to peculiar local conditions of soil and climate never are permanent, always disappearing in more normal and healthy surroundings. Thus the present White Russians of the Rotykno swamps, who are "a sickly race and prematurely decrepit,"[6] become more vigorous when removed to a more favourable environment. It may also be admitted with Schrader that some of the phonetic and structural elements of the primitive Aryan speech have been better preserved in the west than in the east, without accepting the inference that therefore these elements were necessarily first developed in the

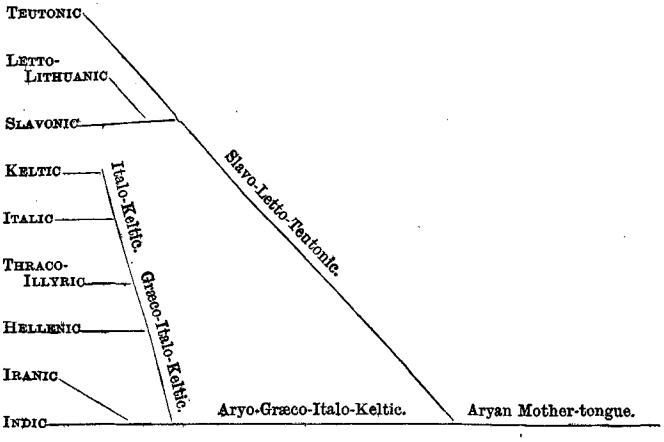
[1] *Anthropologie der Naturvölker:* Leipzig, 1859.
[2] *Op. Cit.* [3] *Sprachvergleichung und Urgeschichte:* Jena, 1883.
[4] The fallacy of these arguments is exposed by Gustav Meyer in the *Zeitschrift für die österreichischen Gymnasien* for June 1884.
[5] *Die Arier:* Jena, 1878. [6] Reclus, *Universal Geography*, v. p. 284.

west. Some old English forms, for instance, have also been better preserved in Ireland and North America than in Great Britain, and even than in their original home in North Germany. It would be as reasonable for future philologists to argue on such grounds that the cradle of English speech is to be sought in the New rather than in the Old World, as for present philologists to infer that the cradle of Aryan speech was in Europe rather than in Asia. Thus the old arguments for the Asiatic origin of the Aryan race remain unimpaired, and have lately received fresh confirmation from the researches of Ch. de Ujfalvy in Turkestan. This ethnologist shows that the Galcha aborigines of the Ferghana and Kohistan highlands are clearly of Aryan stock and speech, while a Galcha skull forwarded by him to Europe proves to be of identical type with the Savoyards, one of the purest branches of the Keltic Aryans. "It solves the chief problem of our national origin. It shows that the brachycephalous race, which invaded Western Europe in the Neolithic age, and which Cæsar found in Central Gaul calling themselves Kelts, were of Asiatic origin."[1] And as the Kelts are admittedly a branch of the Aryan stock, it follows that the general movement of Aryan migration must have been from east to west. This movement is usually supposed to have flowed in two main streams, the Slavs, Lithuanians, and Teutons proceeding by a northern route round the Caspian and Euxine into the European Lowlands; the Kelts, Itali, and Thraco-Hellenes through Asia Minor into the Danube basin and the southern peninsulas. But from the Assyrian cuneiform inscriptions it now seems evident that no Aryan language was current between Media and the Halys (Kizil-Irmak) before the seventh century B.C. It also appears that the Phrygians settled west of the Halys were a Thracian people, who had in comparatively recent times made their way from the Balkan peninsula into Asia Minor. On these grounds some recent writers have argued that no members of the Aryan family can have reached Europe by the southern route across the Bosporus or Hellespont. But the difficulty disappears if we suppose that the movement took place in the Neolithic age prior to the rise of the Babylonian and Assyrian empires, and before the spread of the Hittites over the Anatolian Peninsula.

That Europe was already occupied at that remote epoch by peoples of Aryan speech is rendered probable by the profound disintegration which the primitive Aryan tongue has had time to undergo in this continent. To such an extent had it already become differentiated, even some three thousand years ago, that

[1] Dr. P. Topinard, in *Rev. d'Anthropologie*, October 15, 1878, p. 706.

the order in which the main branches broke off from the common trunk can no longer be clearly determined. There is, however, a general consensus that the European members of the family have diverged from two great divisions,—a northern, comprising the Teutonic, Lettic, and Slavonic, and a southern, comprising the Keltic, Thraco-Hellenic, and Italic, as expressed in the subjoined scheme, which has been proposed by Schleicher, and which, notwithstanding some obvious objections, seems still to harmonise fairly well with the known conditions of the problem :—



6. The Keltic Group.

From their present position in the extreme west of Europe it seems probable that the Kelts were the first to detach themselves from the common Aryan home in Central Asia. Anyhow they have been long enough in Europe to have developed two well-marked subdivisions in times long antecedent to all written record or tradition. These are the Gaedhelic (Gaelic) and Kymric, the former with three, the latter with four branches, as under :—

- Keltic Mother-tongue.
  - Gaedhelic.
    - Irish, Old and Modern.
    - Erse, or Gaelic of the Scotch Highlands.
    - Manx, of the Isle of Man.
  - Kymric.
    - Old Gaulish, extinct.
    - Kymraeg, or Welsh.
    - Cornish, extinct.
    - Brezonek, or Low Breton.
      - Léonarde.
      - Trecorien.
      - Cornouaillère.
      - Vannetense.

Here the Gaedhelic takes the first place, as on the whole representing the purest form of the organic Keltic speech—that is, the form least diverging from the common Aryan prototype. Thus Irish faithfully retains the organic *c* = *qu*, *k*, which in Welsh normally becomes *p*, as in *coic* = *pump* = *five*; *ech* = *ep* = *horse*; *macc* = (*m*) *ap* = *son*, whence the Irish patronymics *MacMahon*, *MacCarthy*, answering to the Welsh (*m*) *ap John*, (*m*) *ap Thomas*, etc. As this change of *k* to *p* was also characteristic of Old Gaulish, that language has been grouped in the above scheme rather with the Kymric than with the Gaedhelic division. Compare *pempedula* with the Latin *quinquefolium* = *cinquefoil*; the *pen* in *A-penn-ines* with the Irish *cenn* = *head*. But our knowledge of this extinct Keltic tongue is very slight, being derived mainly from a few undeciphered inscriptions, and proper names occurring in classic writers. Some patriotic French authors regard it as the parent of the Brezonek still spoken in Brittany, which, however, most authorities derive from the Kymraeg re-introduced to the mainland by the British refugees, who in the fifth century fled thither from the Saxon invaders of Britain.[1]

To these two linguistic correspond on the Continent two ethnical groups, as determined by Broca:[2] 1. The Keltic proper, Cæsar's Celtæ, originally between the Seine and Garonne, a short, swarthy, brachycephalous race, formerly of Kymraeg, now of Romance speech, and at present best represented by the Savoyards, Auvergnats, and Low Bretons; 2. The Gallic, Cæsar's Belgæ, originally between the Seine and Rhine, a tall, light-haired, blue-eyed race, originally perhaps Kelticised Teutons (Cimbri), now partly of Romance partly of Teutonic speech, and at present best represented by the Wallons and some other communities in Belgium and North France. To the latter French anthropologists refuse the designation of Kelts, while freely applying to them the

[1] A distinction, however, has been drawn between the serious and melancholy "Bretons Bretonnants" of British descent, and the vivacious "Gallos" of Upper Brittany, supposed to represent the old Gaulish stock (Vivien de Saint Martin, *Dictionnaire de Géographie Universelle*, p. 525). Some Keltic scholars now also hold that Gaedhelic survived in Devon, Cornwall, and parts of Wales down to the sixth century, if not even later. Hence they argue that the Brezonek cannot be derived from the speech of the people who fled to Armorica from these districts in the fifth century (J. Rhys, *Celtic Britain*, p. 211). The difficulty thus raised may perhaps be removed, if we suppose that the Gaedhelic dialect of these refugees was ultimately supplanted by the Gaulish (Kymric) of the surrounding populations just as it was supplanted by Welsh in South Britain.

[2] "La Race Celtique" in *Rev. d'Anthropologie*, ii. p. 577; and "Nouvelles Recherches sur l'Anthropologie de la France" in *Mem d. l. Soc. d'Anthrop.*, iii. p. 147.

term Gallic and even Kymric, whence almost hopeless confusion in the nomenclature of Keltic ethnology as used by continental and British writers.[1] But this confusion is not merely a question of words. It affects almost every phase of the whole subject, still presenting many fundamental difficulties, that science has hitherto failed to explain. Whence, for instance, two such marked physical groups speaking two varieties of the same Aryan language? Which was the original stock, and what relations do they now bear to each other on the mainland, and especially in the British Isles, where everything seems to be in a state of chaos? The migrations of the Gaedhelians are particularly difficult to follow, because of the Gaedhelic speech no traces survive on the continent, and but few in South Britain and Wales, where nevertheless Welsh archæologists tell us it certainly preceded the Kymraeg. The Kymry themselves have recently been identified by Fligier with the Gimirai of the Assyrian inscriptions—that is, the Gomer of Genesis. But this writer separates them from the Keltic connection, and gives them a middle position between the Hellenes and Asiatic Iranians, thus introducing a fresh element of confusion into the perplexing field of Keltic ethnology. In more recent times the western Kelts retraced their steps eastwards, penetrating into North Italy (Gallia Cisalpina), and through Greece into Asia Minor (Galatia), but everywhere gradually merging in the surrounding populations.

7. The Italic Group.

At one time this group was usually connected with the Hellenic, and the old idea that Latin was derived from Greek still lingers in certain quarters. But, however closely related to each other, their comparative study has shown that they are independent branches of the Aryan family, each preserving a certain share of the common inheritance, while in some important respects the Italic is even more archaic than the Hellenic. Thus Latin re-

[1] It may be doubted whether matters have been mended by Rhys, who substitutes (*op. cit.*) *Brythonic* and *Gallo-Brythonic* for *Kymric*, as the collective name of the second division of the Keltic family. Kymry may have originally been a Teutonic national name (*Cimbri*); and it may have "meant merely fellow-countrymen," gradually acquiring "the force and charm of a national name" (p. 114). But having acquired that "force and charm," its rejection for another less generally recognised term presents no very obvious advantage. This writer also asserts that there is no "reason to suppose that the Belgæ were Teutons" (p. 276). But, if not Teutons, then they must have been Gaedhelians, Cæsar's statement excluding the Gaulish (Kymric) connection. Is Prof. Rhys prepared to accept this alternative?

tains the organic initial *s* before vowels, which Greek constantly drops, or changes to an aspirate, as in ἵζω = *sedeo* = sit (root *sad*); ἕξ = *sex* = *six*; ἑπτα = *septem* = *seven*. Latin also preserves the organic *k*, which in Greek, as in Kymraeg, so often becomes *p*: πεμπε = *quinque*; ἵππος = *equus*, though here there is an older Greek ἵκκος as well as an alternative Latin *ep*, as seen in *ep-ona*, identified by Corssen with the same root.[1]

In the subjoined comprehensive table of the Italic family a place has been provisionally given to the old Etruscan, whose true position has long been a subject of controversy amongst philologists. Corssen, however, has shown that both in structure and vocabulary it is not only Aryan, a point that had been questioned, but apparently akin to the Italic branch of the family. His conclusions have doubtless been questioned, especially by Pauli and Bugge; but they have been confirmed by more recent research, and Bugge himself now admits that Etruscan is an Aryan language, although more closely related to the Hellenic than to the Italic branch.[2] The grounds for this assumption have also been questioned by Professor Elia Lattes, who finally concludes for the Italic affinities of Etruscan,[3] without, however, removing all the objections urged by Dr. Pauli against the Aryan character of that language.[4]

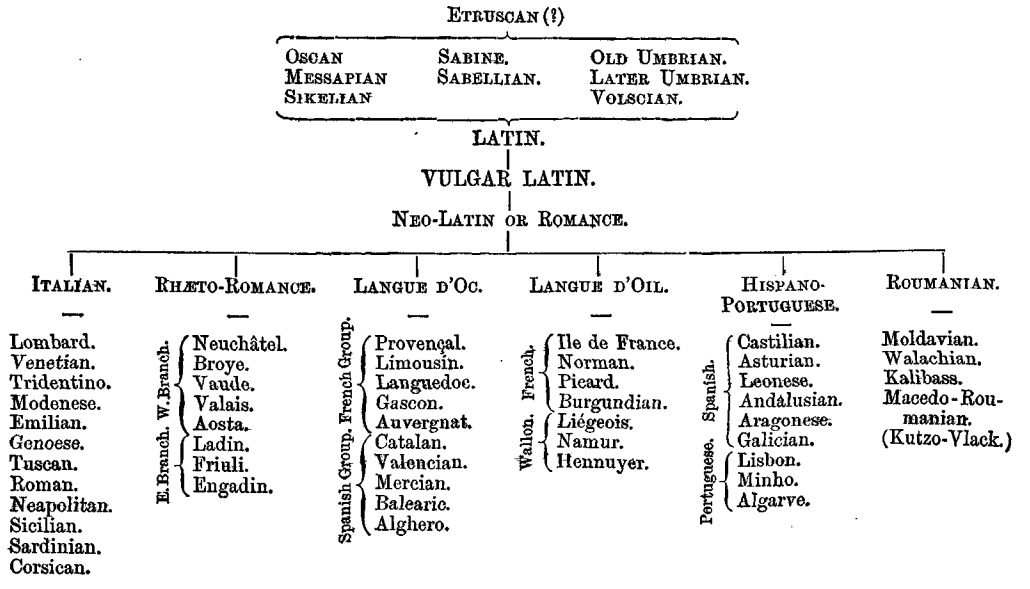
[1] In *Beitr. zur Ital. Sprachkunde*, p. 83.

[2] *Academy*, May 6, 1882.

[3] In *Rendiconti del R. Istituto Lombardo* for May 28, 1884.

[4] In *Etruskische Forschungen und Studien*, in which it is argued that there is no true verb in Etruscan, or at least no distinction between the nominal and verbal suffixes. In Part III. Dr. Pauli also denies the connection established by Corssen between the Etruscan and Italic numerals.

TABLE OF THE ITALIC FAMILY.



Here it will be noticed that all the old Italic languages become absorbed in the Latin, which through its vulgar or vernacular form alone survives in the modern Romance idioms. This vernacular Latin, often referred to by classic writers as the *lingua rustica*, *lingua plebeia*, *sermo campestris*, and so on, differed considerably in pronunciation, vocabulary, and even in structure from the literary standard, and in such peculiarities must be sought the key to the evolution of its present representatives. The general tendency from the first has been from synthesis to analysis, resulting in the total disappearance of the Latin declension and of a large part of its conjugation. In this respect they all now stand much on the same level, although both the Langue d'Oc and Langue d'Oil[1] retained a true accusative case long after it had been lost by the sister languages. They also show a remarkable agreement in the preservation of the Latin tonic accent, and here again French is more faithful to the original than the other members of the group. Thus, while the Latin accented syllable almost invariably survives in French, the place of the accent is occasionally shifted in Italian, as in *diédero*, compared with *dedĕrunt*. But Italian is itself here anticipated by such Old Umbrian forms as *dederont*, *dedrot*, *dédro*, occurring in the Eugubine tables.

The Roumanian differs from all other neo-Latin languages in some important particulars, such as the fusion of the Latin demonstrative as a definite article at the end of the noun. Thus *omul* = *homo ille* = the man. The Roumanian people claim to be lineal descendants of the Roman military colonists settled in Dacia after its conquest by Trajan. But this patriotic delusion, originally exposed by Thunmann,[2] has been finally disposed of by Roesler,[3] who clearly shows that after the withdrawal of the Roman garrisons there were no Latin-speaking communities north of the Danube till the beginning of the twelfth century. About that time the Latinised peoples of Thrace and Mœsia began to move northwards, and in the course of two centuries became numerous enough to establish a powerful Roumanian state in the present provinces of Walachia and Moldavia. Hence the Macedo-Roumanians—that is, the so-called Kutzo-Vlacks or Zinzars of the Pindus highlands, are not to be regarded as the descendants, but as the direct progenitors of the Roumanian peoples now settled north of the Danube.

It is obvious that, as at present constituted, the Italic group is

[1] So named from their respective terms for the affirmative *yes*; *oc* = *hoc*; *oil* = *hoc illud*. Cf. Dante's "lingua del *Si*."

[2] *Geschichte der östl. Völker.*

[3] In his *Romänische Studien*. See also *Die Rumänen und ihre Ansprüche*, by P. Hunfalvy: Vienna, 1883.

purely a linguistic division destitute of all ethnical unity. Popular writers and politicians are doubtless wont to talk of the Latin-speaking world as if it formed some clearly-defined physical branch of mankind. But the absurdity of this view will be apparent if we include in the group, for instance, such a country as Mexico, where Latin is also current, but where nine-tenths of the population are either pure or half-caste Indians. There are, therefore, Latin-speaking communities and Latin-speaking nationalities; but there can be no question of a Latin race. The characteristic Roman features, massive head, low brow, arched nose, with just a suspicion of ferocity, have disappeared even from the banks of the Tiber. Why should they be looked for in the Seine, Tagus, or Lower Danube basins?

8. The Thraco-Hellenic Group.

Here "Thraco" is taken in its old and wider sense, including, besides the Thracians proper, the Illyrians, Mœsians, Macedonians, Epirots,—in a word, all the old inhabitants of the Balkan Peninsula north of Greece, who are supposed to have been Aryans allied to the Hellenes, and who are now represented by the Epirots or Albanians alone. The position of the Albanian language itself has scarcely yet been clearly determined, but it seems to stand somewhat in the same relation to Greek that Etruscan does to Latin. Analogies have even been pointed out between Albanian and Etruscan,[1] suggesting a primitive Thraco-Etruscan group intermediate between the Hellenic and Italic, which, if established, would doubtless help to remove much of the obscurity still surrounding the relations of these important members of the Aryan family. Meantime Albanian is provisionally grouped with Greek in the subjoined table of the Thraco-Hellenic division:—

Thraco-Illyric.			Pelasgo-Hellenic.		
Thracian, Phrygian, Mœsian, Illyrian, Albanian.			*Æolian.*	*Dorian.*	*Ionian.*
Gheg.		*Toshk.*	Cyprian.	Argive.	Attic.
	Klementi.	Toxides.	Lycian.	Laconian.	Byzantine.
	Hoti.	Yapides.	Lesbian.	Megarian.	Romaic.
Malliesor.	Kastrati.	(Lapides.)	Bœotian.	Phoccean.	
	Pulati.		Thessalian.	Locrian.	Phanariot. Sphakiot.
	Dukagine.		Arcadian.		Mainot. Cypriot.
	Matia.	*Khamides.*		*Cretan.*	Kakavouniot. Kimariot.
Mirdite.	Fandi.	Calabrian.		Tsakonian.	
	Dibri.	Sicilian.			

[1] *Lattes, loc. cit.*, p. 501. It is noteworthy that the Greeks called the Etruscans Pelasgians as well as Tyrrhenians.

By the Turks the Albanians are called *Arnaouts*, from the Byzantine *Arvanites*, probably a corrupt form of *Albanites*, from the old Kelto-Italic root, *alb*, *alp* = height, hill. Hence Albanian, *i.e.* highlander, has the same meaning as the national designation *skipetar*, from a root *skip*, *scop*, also meaning rock, hill.[1] Of their two main divisions the Gheg, or northern, is much the purest, the Toshk, or southern, having become largely Hellenised in speech, physique, customs, and religion. Hence the numerous Toshk immigrants in various parts of Greece and the Archipelago soon became absorbed in the surrounding Hellenic populations. On the other hand the Gheg communities settled in Calabria and Sicily since the wars of the famous hero "Scanderbeg" (George Kastriota, ob. 1467) still retain their national traditions and language. Of all European Aryans the Albanians alone have preserved the tribal organisation, and amongst the Ghegs there are still as many as twenty *phis* or *phar*—that is, clans. The practice of exogamous marriage also survives amongst the Mirdites south of the river Drin, who, although Roman Catholics of the Latin rite, seek their wives amid the surrounding Turkish and Mohammedan populations. The other Gheg tribes are mostly Mussulmans, and the Toshks Orthodox Greeks.

Of Greece proper the earliest known inhabitants were vaguely spoken of as Leleges or Pelasgians, probably Thraco-Illyrians subsequently absorbed or assimilated in speech and type to the kindred Hellenes. Herodotus somewhat sharply distinguishes between the true Hellenes and the Pelasgians, and tells us (i. 57) that in his time Pelasgian dialects still survived at Creston in Thrace, and at Placia on the Hellespont. On the other hand, Dionysius identifies the two peoples,[2] and it is noteworthy that in Homer the epithet Ἶλοι is applied to the natives of Pelasgiotis in Thessaly. The Greek tribe itself, whose name was adopted by the Latins as the collective designation of the whole race, appears to have been Pelasgian. In Greece such more or less general terms as Achæans, Danai, Argians, Dolopes, Myrmidons, ultimately yielded to the national name, Hellenes—that is, descendants of Deucalion's son Hellen, whose two sons, Æolus and Dorus, and grandson, Ion, were supposed to be the progenitors of the Æolians, Dorians, and Ionians. But such traditions are merely reminiscences of times when the tribal organisation still prevailed, and it may be taken for granted that the three main branches of the Hellenic stock did not spring from a particular family that rose to power in comparatively recent times in the

[1] Cf. the Gr. *σκόπελος*, Lat. *scopulus* = cliff, crag, headland.
[2] Τὸ τῶν Πελασγῶν γένος Ἑλληνικόν.

Thessalian district of Phthiotis. Whatever truth may lie at the base of the Hellenic legend, it is certain that at the time when Hellen is said to have flourished, some 1500 years before the new era, the Æolic-speaking communities of Thessaly, Arcadia, Bœotia, the closely-allied Doric of Phocæa, Argos, and Laconia, the Ionic of Attica, had already been clearly differentiated. Later on these dialects, which differed chiefly in their phonetics, were gradually merged in the literary neo-Ionic or Attic, which thus became the κοινη διαλεκτος, or current speech of the Greek world. Admirable alike for its manifold perfections and surprising vitality, the language of Æschylus, Thucydides, and the other great Athenian writers, outlived all the vicissitudes of the Byzantine empire, during which it was for a time banished from Southern Greece, and still survives, although in a somewhat degraded form, in the Romaic or neo-Hellenic tongue of modern Hellas. For Romaic differs far less from the classic standard than do any of the Romance languages from Latin. The divergence is shown chiefly in the pronunciation of the vowels and diphthongs, many of which are fused in the single sound of *i*, in the substitution of accent for quantity, in the disappearance of the infinitive mood and dative case, and in a general tendency towards analytic forms. Since the restoration of Greek independence great efforts have been made to revive the old language in all its purity, and some modern writers now compose in a style differing little from that of the classic period.

Yet the Hellenic race itself has almost perished on the mainland. Traces of the old Greek type have been detected by Lenormant and others, especially amongst the women of Patras and Missolonghi. But within living memory Attica was still an Albanian land, and Fallmerayer has conclusively shown that the Peloponnesus and adjacent districts had become thoroughly Slavonised during the sixth and seventh centuries.[1] "For many centuries," writes the careful Roesler, "the Greek peninsula served as a colonial domain for the Slavs, receiving the overflow of their populations from the Sarmatian lowlands."[2] Their presence is betrayed in numerous geographical terms, such as Varsova in Arcadia, Glogova, Tzilikhova, etc. Nevertheless, since the revival of the Hellenic sentiment, there has been a constant flow of Greek immigration from the Archipelago and Anatolia; and the Albanian, Slav, Italian, Turkish, Kutzo-Vlack, and Norman elements, have in the modern kingdom of Greece already become almost completely Hellenised

[1] *Geschichte der Halbinsel Morea*, etc., Stuttgart, 1830. See also G. Finlay's *Mediæval Greece*, and the *Anthrop. Review*, 1868, vol. vi. p. 154.

[2] *Romänische Studien*, p. 233.

at least in speech. But of the old Greek dialects the Doric alone appears to have survived in the Tsakonic of the Laconian hills. The Greek language has also disappeared from Magna Græcia (Southern Italy), from Sicily, Syria, and the greater part of Asia Minor, where it was long dominant.

9. The Teutonic Group.

At present the peoples of Teutonic speech occupy most of Central and North-west Europe, from the Alps to Cape North, and from the Niemen to Iceland. But when they first came in contact with the Romans their domain was mainly restricted to the region between the Lower Rhine and Vistula, being elsewhere hemmed in by the Helvetii, Boii, Taurisci, Scordisci, and other Keltic nations stretching east to the Carpathians. They were still without a general national name, although already divided into two fundamental branches, the Low and High Germans, to whom some modern ethnologists have respectively applied the collective terms Cimbri (Kymri) and Teutons—that is, "People."[1] The latter has since become the universal designation of the whole group, while the former appears at an early date to have passed as an ethnical name from a branch of the Teutonic to a branch of the Keltic family. Within the historic period the Low German has ramified into two secondary divisions, the Niederdeutsch or Low German proper of the North German lowlands, and the Norse or Normannic of Scandinavia. At least Professor George Stephens holds that the peculiar forms of Norse speech—agglutinated article, change of final *s* normally to *r*, passive or middle voice, etc.—are of comparatively recent growth, subsequent even to the very oldest Runic inscriptions.[2] On the other hand a still older Teutonic branch, the Gothic or Mœso-Gothic of the Goths settled south of the Lower Danube in the fourth century, has disappeared, now surviving only in the Codex Argenteus of Upsala, which contains portions of the New Testament, translated by Bishop Ulphilas about the year 380. A careful study of this precious document, representing by far the oldest extant form of Teutonic speech, clearly allies it to the Low German branch, as shown in the subjoined table of the Teutonic peoples grouped according to their languages :—

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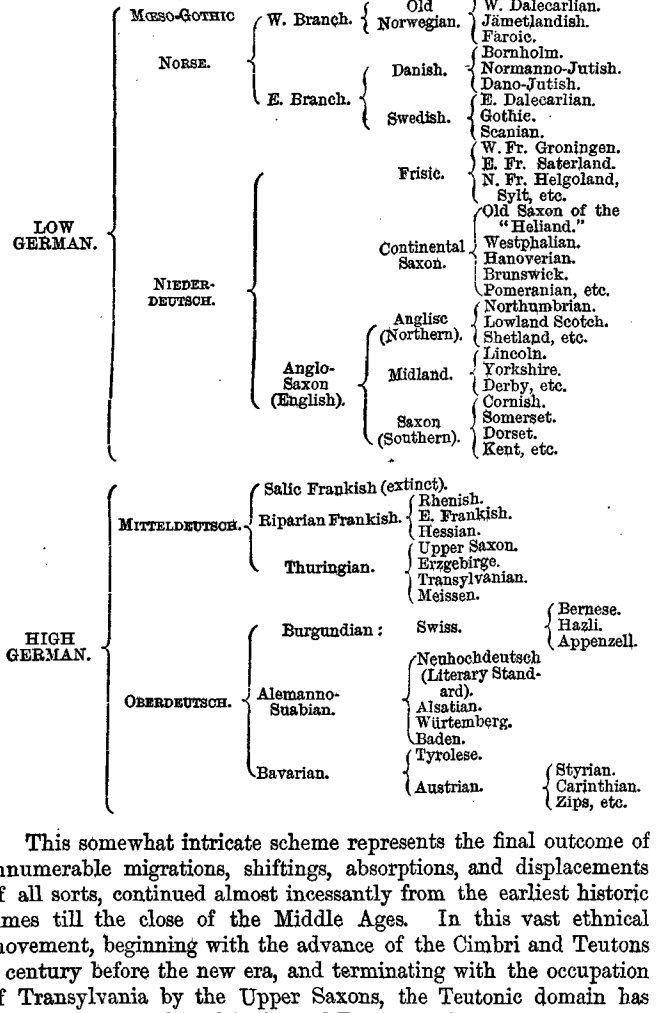
[1] From *thiuda*, whence the later forms *Tudesk, Teutsch, Deutsch, Dutch.*

[2] *The Old Runic Monuments of Scandinavia and England*, vol. iii. *passim.*



This somewhat intricate scheme represents the final outcome of innumerable migrations, shiftings, absorptions, and displacements of all sorts, continued almost incessantly from the earliest historic times till the close of the Middle Ages. In this vast ethnical movement, beginning with the advance of the Cimbri and Teutons a century before the new era, and terminating with the occupation of Transylvania by the Upper Saxons, the Teutonic domain has become greatly enlarged in Central Europe at the expense especially of the surrounding Keltic and Slavic populations. During the early migrations the Kelts were partly expelled, partly assimilated,

in South Germany, in most of the Alpine regions, and in large tracts of North-east Gaul. But in the east the Teutons were in their turn for a time driven back by the Slavs, who had in the eighth century reached their extreme western limits about the neighbourhood of Nürmberg in the south, and the river Saale farther north. But these Polabs, Sorbs, Wends, and other western Slavs, were gradually absorbed by the Teutons, who thus recovered and enlarged their lost domain in the east. The recovery was effected chiefly by the Low Germans, who were at that time collectively known as Saxons, and who formed three political divisions,—the Westphalian, Enger, and Eastphalian,—besides an independent group in Sleswig-Holstein. Thus it happened that the Saxon name and Low German speech became diffused throughout Mecklenburg, Brandenburg, Pomerania, and Prussia. Later on the term Saxon, owing to political causes, received a farther extension towards the south-east, whence arose the distinction between the Upper and Lower Saxons, the latter Low Germans, the former allied to the High Germans of Bohemia and Silesia.

Corresponding to the Saxon confederation in the north was that of the Alemanni in the south, which at an early period comprised all the Upper Rhine regions, Alsace, Baden, East Switzerland, and West Tyrol. North-east of the Alemanni, and politically connected with them in the fourth and fifth centuries, was the Suabian Confederacy, embracing the Upper Neckar and Danube as far as the Lech. East of the Suabians were the Bayovers (Bavarians), originally from Bohemia, and west of them the Burgundians, since Latinised in East France. A connecting link between all these High Germans and the Saxon Low Germans was formed by the Franks, at first a purely political division, comprising the Catti (Hessians) and other tribes along the middle and lower Rhine, as well as some undoubtedly Low German peoples in the north, the former known as Ripuarian, the latter as Salic Franks. These passed into Gaul, where they became absorbed in the Kelto-Roman populations, their name alone surviving in that of the region now known as France. The Ripuarian Franks remained in their original home, thence called East Franconia, and later on simply Franconia. The dialects of all these middle Rhenish and Frankish populations are closely related, and allied more to the High than to the Low German, through the Thuringian of the Weser Valley merging gradually eastwards in the mixed forms of the modern kingdom of Saxony, and through these with the Saxon of Transylvania, which marks the extreme eastern limit of the Germanic domain.

In the western movement to Britain the chief part was again played by the Low German Saxons, with the kindred Frisian and Anglian tribes of Sleswig and the north-west seaboard. No doubt many parts of South Britain had been occupied by Teutonic peoples many centuries before these recent arrivals. But they had mostly lost their ethnical independence and become absorbed in the Romano-British communities. Hence the Anglo-Saxon[1] invasion, almost coincident with the withdrawal of the Roman legions early in the fifth century, may be regarded as a fresh settlement, in which the Romano-Keltic element became ultimately absorbed, or at least Germanised in speech, political institutions, social usages,—in a word, in everything constituting the distinctive national features of a people. Henceforth the greater part of Britain is no longer Siluro-Teuto-Keltic, but Siluro-Kelto-Teutonic, afterwards locally modified by pure Norse elements from Scandinavia, and Romanised Norse elements (Normans) from Normandy. But the Norsemen being themselves a branch of the Low Germans, it is obvious that such additions merely tended to intensify the Teutonic at the expense of the older Keltic and still older Silurian ethnical elements throughout the British Isles.

On the other hand, the Anglo-Saxon speech became so deeply affected by Romance influences that its modern English representative occupies altogether an anomalous position in the Teutonic group of languages. But while becoming almost more than half Italic in its vocabulary, English has nevertheless remained purely Germanic in its structure. At the same time it may be admitted that the tendency to analysis, carried to a greater extent than in any other member of the Teutonic group, has been stimulated by Norman influences. After leaving the Anglo-Saxon grammar a mere wreck, this tendency has been arrested in the standard English of literature. But the process has gone much farther in some of the provincial dialects, as, for instance, in that of Holderness, south-east Yorkshire, which has abolished the possessive (*Jack hat* for *Jack's hat*); all personal verbal endings (*ah is, thoo is, he is*, etc.); the adverbial *ly* (*bad* = *badly*); besides suppressing the aspirate and reducing *-ing* to *-in* (*thinkin* = *thinking*). This dialect has thus almost returned to the analytic state from which its Aryan progenitor slowly emerged many ages ago.[2]

The Teutonic type—florid complexion, blue eyes, flaxen hair,

[1] For a vindication of this compound term, Anglo-Saxon, against the frivolous objections of a recent school of English ethnologists, the reader is referred to the writer's *History of the English Language*, enlarged edition, Preface: Longmans, 1875.

[2] See *English Dialect Society's Series*, C., No. VII.: Trübner, 1877.

regular features, dolichocephalous head, tall stature,—which was characteristic of all Germanic tribes in the time of Tacitus, has disappeared in most parts of Germany, owing doubtless to fusion with Keltic, Slav, and other foreign elements. It is still found, however, in the extreme north, and especially in Scandinavia, most of which region appears, from the recent researches of Dr. Oscar Montelius,[1] to have been in the exclusive possession of Germanic peoples for at least 4000 years. Here the men, not only of the Iron, but also of the preceding Bronze age, were of this stock, and Huxley's Xanthochroi, or "fair whites," as distinct from the Melanochroi, or "dark whites" of Southern Europe, are thus in the north traced back at least to the close of the Neolithic age. A certain support is thus given to the theory of those anthropologists who hold that the blonde type itself was differentiated in Scandinavia or on the Baltic seaboard. At present the Scandinavian race, which at one time overran a great part of the Continent, is again confined to its original home in Denmark, Sweden, Norway, the Färöe Islands, and Iceland. Of all its former conquests it has retained little more than a few strips along the coast of Finland, and even here the Swedish is gradually yielding to the Finnish tongue. Of all the Norse languages by far the best preserved is the Icelandic, which still differs little from the old Norwegian introduced with the first settlers in the ninth century. In this language was composed the famous "Edda," or northern epic poem of Snorri Sturlusson. But even in remote pagan times the Norse language had been reduced to writing, and Mr. Isaac Taylor has shown that the Scandinavian "runes" are derived, not from the more recent Roman, but from the far older letters of the Greek settlers in Thrace and Scythia some five or six centuries before the new era. It is remarkable that the oldest alphabets are by far the most perfect, consisting of nearly thirty letters, which in later times were reduced to sixteen. The change, which appears to have been sudden, was probably due to the influence of the early Christian missionaries, and especially to the Irish, whose alphabet also consisted of sixteen letters only.

10. The Slavonic Group.

The Slavs, vaguely spoken of by the ancients as Scythians and Sarmatians, are first distinctly mentioned in the sixth century by Procopius, who gives them the collective designation of Spor, and divides them into two main branches, the Antes in the east, and the Slavs in the west. Spor, which occurs nowhere else, is

[1] *Nordisk Tidskrift*, February 1884.

perhaps the Russian Sbor—that is, collection, gathering, merely denoting a general federation of tribes, hence analogous to the contemporary Allemanni of the southern Teutons. Antes may possibly be identical with Wend, by some supposed to be the oldest national name, still applied to some branches by the Germans, and occurring in classic writers under the forms Veneti, Venedi, Heneti. There were Veneti at the head of the Adriatic, whose name survives in the modern Venice, and Pliny mentions the Venedæ on the Lower Vistula, from whom was named the Venedicus Sinus. But whatever may be thought of these coincidences, all other collective terms were soon superseded by that of Slav, identified by some with Slava (glory), by others more probably with Slovo (word, speech), implying a people of distinct or intelligible utterance. In the Chronicles attributed to Nestor the Russians are stated to have been originally called Slovenes, and there are other indications that the oldest form of the word was *Slov*, not *Slav*. The latter, however, was the prevalent form in early mediæval times, and as such passed into the Teutonic and Romance languages in the sense of *slave*, owing to the large number of Slav prisoners enslaved during the wars with the western nations.

At present the Slav domain, which has absorbed nearly all the Tatar and Finnish territories in the Russian steppes, comprises most of the Continent east of a line drawn from Trieste on the Adriatic through Prague to Danzig on the Baltic. As in the time of Procopius, it still forms a western and eastern division, the latter of which has received a southern extension to the Balkan Peninsula.[1] The western group consists mainly of the Poles, Tsekhs (Bohemians), Moravians, Slovaks, and Lusatians ; the eastern and southern of the Great and Little Russians, Serbo-Croatians, Slovenians, and Bulgarians. Although the Slav dialects are neither so numerous nor so divergent as those of the Teutonic family, the question of their mutual relations has given scarcely less trouble to philologists. Here the difficulty arises from the lack of any common standard of comparison older than the so-called Church Slavonic—that is, the form adopted about the middle of the ninth century by the Apostles Cyril and Methodius as the liturgical language of the first Slav Christian communities. The oldest manuscript of their

[1] This extension dates from the seventh century, when the Serbo-Croatians migrated southwards from the Carpathians. In Slav the term *Carpath* means "highlands," and is preserved in the national name of the Croatians (*Chrovat, Khrebet*). From the north also came the Serbs, as is evident from Alfred's *Orosius:* And be nordan Dalomensam sindon *Surpe, i.e.* "And north of the Dalomenses are the *Surp.*" Here are still the *Sorbs* of Lusatia.

version of the Bible dates only from the year 1056, nor is it any longer possible to determine with certainty the region where this now extinct dialect was current. Most authorities localise it in Bulgaria, and even call it "Old Bulgarian," in contradistinction to the very corrupt dialect now spoken in that district. In the subjoined table[1] Church Slavonic finds a place intermediate between the Russian and Serbo-Croatian groups, which appear to resemble it most in their phonetics and grammatical structure.

Eastern and Southern Division.	Russian.	Great Russian.	Moscow.
			Novgorod.
			Don Kossack.
			Siberian.
		White Russian.	
		Little Russian (Ruthenian).	Ukranian.
			Galician.
			Carpathian.
	Bulgarian.	Old Bulgarian (Church Slavonic).	
		New Bulgarian.	
	Serbo-Croatian.	Servian.	
		Croatian.	
		Dalmatian.	
		Syrmian.	
	Slovenian.	Carinthian.	
		Styrian.	
Western Division.	Bohemian.	Tsekh.	
		Moravian.	
		Slovak.	
	Polish.	Mazurian.	
		Great Polish.	
		Silesian.	
		Kashubian.	
	Lusatian (Sorb).	Upper Lusatian.	
		Lower Lusatian.	
	Polabish.	Polabish (extinct).	

During their diffusion over half the Continent the Slavs have become so intermingled with other peoples—Teutons in the west, Thracians and Roumanians in the south, Finns, Tatars, and Mongols in the north and east—that anthropologists have failed clearly to determine a primitive Slav type. The original stock was probably xanthochroic, like the Teutonic; but at present the only general characteristic is brachycephaly, a feature common also to the surrounding Finno-Tatars. Other more or less marked traits are a somewhat swarthy complexion, small deep-set eyes, short, straight, or slightly concave nose, dark brown straight hair, rather scant eyebrows, full beard, medium stature. Distinct from all the other

[1] Based mainly on the classification proposed by A. N. Pypin and V. D. Spasovich in their *Geschichte der Slavischen Literatur*, T. Pech's German translation, vol. i.: Leipzig, 1880.

groups are the Bulgarians, originally of Ugro-Finnic stock, but assimilated to the Slavs in speech since the tenth century. Nicephorus Gregoras (fourteenth century) tells us that they take their name from the river Βουλγα (Volga), which watered the country whence they migrated southwards. This region is spoken of by mediæval writers as the "Greater Bulgaria," north of which stretched the "Greater Hungary," and we now know that, being Ugrian Finns, the Hungarians and Bulgarians came originally of one stock. But their fate has been different, for while the Hungarians have lost their racial type and retained their Ugrian speech, the Bulgarians have lost their speech and to some extent preserved their racial type. On the other hand, the Polabish Slavs—that is, the Slavs of the Elbe basin [1]—have become completely Teutonised both in speech and type. Other members of the Slavonic family have also suffered from Teutonic encroachments, and at present the German Jews appear to be displacing numerous communities, especially in Russian Poland. But farther east the Slav race is not only absorbing the Finno-Tatar populations of the Volga basin, but rapidly extending its domain throughout Siberia and Caucasia. The only possible future rival of the "Greater Britain" beyond the seas will be the "Greater Russia" of Central and Northern Asia.

11. The Letto-Lithuanic Group.

At one time stretching nearly from the Baltic to the Euxine, this group is at present restricted to a narrow territory at the south-east corner of the Baltic, where it is hemmed in on the south-west by German, on the south and east by Russian, on the north by Esthonian (Finnish) communities. It is thus confined to the Russian provinces of Kourland, Livonia, and Kovno, and to the north-east corner of East Prussia. But notwithstanding its limited geographical area it forms one of the most interesting linguistic groups in the Aryan domain, adhering more faithfully than any other living member of the family to the primitive Aryan speech. There are three well-marked dialects with several varieties, as under :—

- Lithuanian.
  - High Lithuanian.
  - Krivich.
  - Low Lithuanian.
  - Jemaitic.
- Lettic.
  - Lettish proper.
  - Krivinian.
- Pruczi (extinct).

[1] From *po* = by, near, and *Labe* = Elbe.

In some respects more archaic than either of its congeners, Pruczi, or Old Prussian, which ceased to be spoken some two centuries ago, occupies a middle position between the two. Lithuanian, however, is, on the whole, by far the best preserved member of the group. Although betraying more numerous points of contact with Slavonic than with any other Aryan language, it also exhibits some marked affinities with the Hellenic, Teutonic, Iranic, and Indic branches. It is thus of paramount importance for the comparative study of these tongues, while its preservation during thousands of years, without the aid of any literary standard or political prestige, must be regarded as a most remarkable linguistic phenomenon.

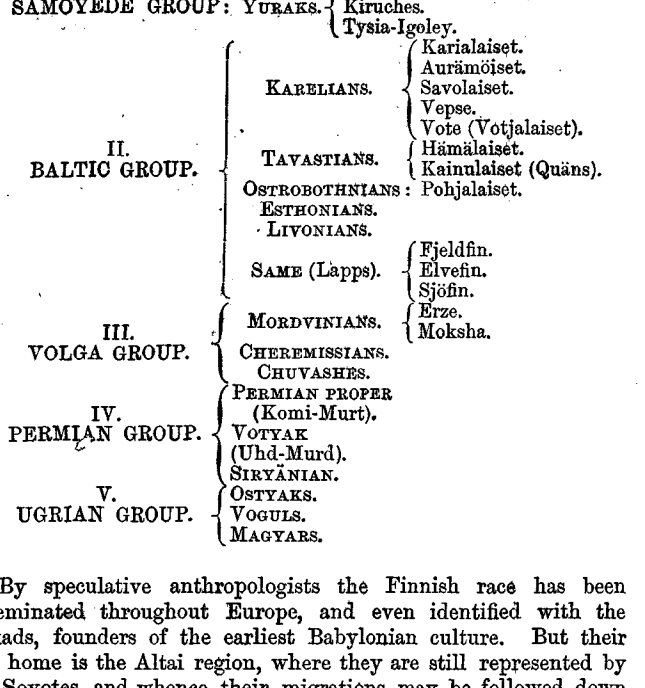
12. The Finno-Tatar (Uralo-Altaic) Family.

An account of this wide-spread division of the Mongolic world belongs properly to the ethnology of Asia, where it is best represented. In Europe the Tatar (Mongolo-Tatar) branch is now confined to the extreme east, where are found scattered communities of Tatars proper and Nogai-Tatars in the Volga basin, in Cis-Caucasia and Crimea; Osmanli Turks, in the Balkan Peninsula; Bashkirs, Meshcheryäks, Tepyäks, and some other mixed Tatar peoples, partly assimilated either to the Finns or to the Slavs, in Orenburg and the Middle Volga valley; lastly, some Kirghiz (Tatar) and Kalmuck (true Mongolian) hordes on either side of the Lower Volga and north-west Caspian seaboard. On the other hand the Finnic branch, although of undoubted Asiatic origin, now belongs almost entirely to Europe, where all its subdivisions are represented, and where it has been settled chiefly in the extreme north and north-east from prehistoric times. The term Finn, already occurring in Pliny (4, 13) and Tacitus (*Germania*, 46), and later on in Procopius and Alfred's *Orosius* (Finnas, Scride Finnas, Ter Finnas), is simply the Teutonic translation of the national name Suomalaiset[1]—that is, "Fen People," dwellers in the fenny, lacustrine region of Finland. But far from being confined to this region, the Finns, or Chudes,[2] as the Russians call them, are spread under various local names over Lapland, North Russia (Archangel), both slopes of the Urals, and in scattered groups along the Middle Volga, besides occupying a large outlying enclave in Hungary. There are thus altogether five main branches,

[1] From *suoma*=fen. The same root occurs in *Same*, the national name of the Lapps (called Finns by the Swedes), and in *Samoyede*.

[2] Supposed by some to be the same word as *Scythian*, through an intermediate form, *Skud*.

which, with their various subdivisions, may be tabulated as under :—



By speculative anthropologists the Finnish race has been disseminated throughout Europe, and even identified with the Akkads, founders of the earliest Babylonian culture. But their true home is the Altai region, where they are still represented by the Soyotes, and whence their migrations may be followed down the Ob valley, over the Urals and along the Kama and Volga to their most advanced outposts on the Baltic seaboard. The speech of all the branches is agglutinating and clearly allied to the Mongolo-Tatar linguistic family. But the physical type presents every shade of transition, from the original Mongolic as seen in the Samoyedes and in the Ugrian Ostyaks, to the light and dark varieties of the Caucasic, as seen in the Suomalaiset, or Finns proper, of the Baltic, and in the Hungarian Magyars respectively. Even amongst the Finns themselves, although all alike brachycephalic, Gustavus Retzius[1] discriminates between the eastern

[1] *Finska Kranier:* Stockholm, 1878. See also A. H. Keane's "Finnic Ethnology," *Nature,* December 24, 1879.

Karelians with their tall slim figures, oval face, straight and hazel eyes, dark or chestnut hair falling in ringlets over the shoulders, lively frank expression, the true descendants of Ilmarinen, hero of the Kalevala epic, and the western Tavastians of middle size, square build, large head, broad flat features, prominent cheek-bones, short broad nose, tawny complexion, grayish-blue and slightly-oblique eyes, flaxen or rather towy hair, scant beard, dull sullen expression. Retzius regards the Karelians as the typical Finns; but they appear to be rather an amalgam of Slav and Mongolic elements, while the Tavastians are obviously Mongols grafted on a Teutonic stock. Thus there is no fundamental Finnic type, and here as elsewhere everything resolves itself ultimately into one or other of the two everlasting primeval elements, fair Caucasic and yellow Mongolic, already differentiated and diffused throughout the Asiatic and European Continents in Neolithic times.

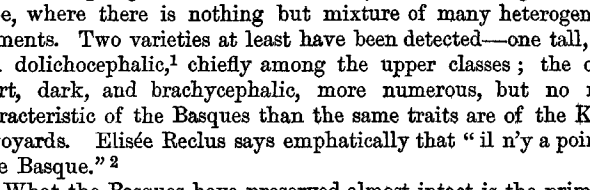
13. The Iberian (Basque) Family.

Owing to its abuse by certain recent theorists, the term "Iberian" has fallen somewhat into disrepute. Nevertheless it is impossible to dispense with this venerable historic name, which was formerly applied to the whole of the Spanish peninsula, which survives in the geographical terms *Ebro*, Cant-*abria*, and which conveniently designates a primitive non-Aryan race in pre-Aryan times in possession of South-west Europe as far north as the Garonne, probably including Sardinia, Corsica, and North-west Italy (Liguria), but doubtfully North Africa. Of this Iberian race, so limited, the only known survivors are the Basques, now confined to the west corner of the Spanish and French Pyrenees.[1] The term Basque itself is of respectable antiquity, the people having been known to the Romans as *Vascones* (Pliny, 3, 3) before the new era. The same root is found in the name of the *Ausci*, the primitive inhabitants of Aquitania; and Aquitania itself later on again took the title of Vasconia (Gascony) when reoccupied by the Basques between 580 and 602 A.D. It still lives in the province of *Viscaya*, and the Bay of *Biscay*, and probably forms the first part of the compounds Euskara, Euscaldun, and Euscaldunherri,

[1] In his classical work, *Prüfungen der Untersuchungen über die Urbewohner Hispaniens*, etc., W. von Humboldt clearly shows that the primitive geographical nomenclature of the Peninsula is distinctly Basque. Thus there were Illiberis, *i.e.* "new towns," in the extreme south and north of Spain and in Aquitania; and the Basque words *ur* = water, *iturria* = spring, *asta* = rock, etc., are of frequent occurrence—always in harmony with the nature of the localities.

the respective native names for the language, the people, and their country. At the same time it is impossible to maintain that the old Iberian type, of which nothing is known, but which has been made the subject of so many fanciful theories, survives in the present Basque population. Long before the advent of the Carthaginians and Romans they had become largely intermingled with the Kelts, as shown by the mixed Celtiberians in the heart of the peninsula and the Gallæci (Gallicians or Gauls) in the north-west. Later on the country was successively overrun or invaded by the Sueves and Visigoths, by the Merovingian and Carlovingian Franks, by the Arabs, French, and Spaniards. Hence it is not surprising that anthropologists have had difficulty in determining a distinct type, where there is nothing but mixture of many heterogeneous elements. Two varieties at least have been detected—one tall, fair, and dolichocephalic,[1] chiefly among the upper classes; the other short, dark, and brachycephalic, more numerous, but no more characteristic of the Basques than the same traits are of the Keltic Savoyards. Elisée Reclus says emphatically that "il n'y a point de type Basque."[2]

What the Basques have preserved almost intact is the primitive Iberian language, but for which no one would have ever thought of separating them from their French and Spanish neighbours. It is in virtue of this marvellously preserved language that they are a law unto themselves, and remain the crux of European ethnology. Notwithstanding its present limited domain Basque presents a great diversity of forms, of which the chief are comprised in the subjoined table:—



None of the French or Spanish Navarrese dialects seem to have ever been reduced to writing. But the four others possess a sort of literature, the oldest printed specimen of which dates from

[1] Thus in an old Basque MS. lately found at Santiago occurs the passage: "Bascli facie candidiores Navarris approbantur." Quoted by Rev. W. Webster in *La Nouvelle Revue*, April 1881.

[2] *Géographie Universelle*, i. p. 855.

the year 1545.[1] All, however, resemble each other in their essential features, which are so peculiar that it becomes difficult to find a suitable place for Basque in any linguistic classification. It fuses the formative elements with the root to a far greater extent than the Finno-Tataric, Bantu, or any other agglutinating family of the old world; it employs composition by syncope like the polysynthetic American languages; lastly, Mahn[2] has shown that it is in some respects even more highly inflecting than the Aryan and Semitic groups themselves. In a morphological classification of speech Basque thus stands quite apart, being somewhat intermediate between the agglutinating, polysynthetic, and inflecting orders; and for this unique position the term Incorporation (Einverleibung), first proposed by Humboldt, might be conveniently reserved. In any case the persistence of Basque throughout endless political and social vicissitudes, probably from the Stone age down to the present day, is a conspicuous instance of the importance of language in ethnological studies. Of fundamental races nothing now remains in Europe beyond the fresh creations that time has been able to mould from diverse heterogeneous elements since the great waves of migration have subsided. Yet here is a peculiarly intricate form of speech which, unaided by political prestige or the conservative influence of literature, has maintained its integrity in a few upland Pyrenean valleys, at all events since Neolithic times. From this, however, it does not follow that linguistic are more stable than physical types, but only that under certain conditions speech may survive the effacement of racial features.

14. Statistics of the European Languages.

Of the present population of Europe, estimated at about 330,000,000, not more than 24,000,000 are of non-Aryan speech, while fully 300,000,000 belong to the three great Teutonic, Romance, and Slav branches of the Aryan family. It is generally supposed that of these the Slavonic is the most numerous; but from the subjoined table, prepared from the latest official returns, it will be seen that it ranks third only, being exceeded both by the Romance and the Teutonic, the latter heading the list with a total of about 105,000,000.

[1] B. Dechepare's *Linguæ Vasconum Primitiæ:* Bordeaux, 1545; one copy extant.

[2] In *Denkmäler der Baskischen Sprache:* Berlin, 1857. An admirable though now almost forgotten little treatise, betraying a deep insight into the philosophy of speech.

ARYAN DOMAIN.

TEUTONIC.	German (Empire, 42,000,000; Austria, 10,000,000; Switzerland, 2,000,000; Russia, 1,000,000)	55,000,000	
	English (British Isles)	34,000,000	
	Dutch (Holland)	4,000,000	
	Flemish (Belgium)	3,000,000	
	Swedish (Sweden, Finland)	5,000,000	
	Danish (with Icelandic, 60,000, and Faroic, 10,000)	2,000,000	
	Norwegian	2,000,000	
			105,000,000
ROMANCE.	French (France, 36,500,000; Germany, 3,000,000; Switzerland, 500,000)	40,000,000	
	Italian (Italy, Sardinia, Corsica, Sicily)	29,000,000	
	Spanish (with Catalan, Galician, etc.)	16,000,000	
	Portuguese	4,000,000	
	Roumanian (Roumania, Hungary, Balkan Peninsula)	8,000,000	
	Wallon (Belgium)	2,500,000	
	Rhæto-Romance (Switzerland, Tyrol, Friuli)	500,000	
			100,000,000
SLAVONIC.	Great and White Russian	50,000,000	
	Little Russian (Ukrania, Galicia, etc.)	16,000,000	
	Polish (Russia, Austria, Prussia)	11,000,000	
	Tsekh Slovak (Bohemia, Moravia, North Hungary)	7,000,000	
	Serbo-Croatian Slovenian (Carinthia, Croatia, Bosnia, Herzegovina, Servia, Dalmatia, Montenegro)	7,360,000	
	Bulgarian (Bulgaria, Rumelia)	3,500,000	
	Sorb (Upper and Lower Lusatia)	140,000	
			95,000,000
LETTO-LITHUANIAN (Kovno, Kourland)			3,000,000
THRACO-HELLENIC.	Greek (Greece, Archipelago)	3,500,000	
	Albanian (Albania, Greece, Italy)	1,750,000	
			5,250,000
KELTIC.	Welsh (N. and S. Wales)	1,000,000	
	Breton (West Brittany)	1,370,000	
	Irish (Munster, Connaught, Ulster)	860,000	
	Gaelic (Scotch Highlands)	360,000	
	Manx (Isle of Man)	10,000	
			3,600,000

Finno-Tatar Domain.

Finnish.	Magyar (Hungary)	6,500,000	
	Baltic Finn (Finland, Lapland, Esthonia, Livonia)	3,000,000	
	Volga and Ugrian Finn (Middle Volga, Perm, Urals)	2,000,000	
Tatar.	Tatar (Orenburg, Volga, Crimea)	3,750,000	
	Osmanli (Balkan Peninsula)	1,250,000	
Mongol.	Kalmuck (Lower Volga)	100,000	
			16,600,000

Miscellaneous.

Basque (both slopes of Western Pyrenees)	600,000	
Armenian (Balkan Peninsula, Austria, etc.)	550,000	
Gipsey (Austria, Turkey, Russia, Spain, etc.)	500,000	
Circassian (Balkan Peninsula)	150,000	
Maltese, Arab, and Sundries	250,000	
		2,050,000

Résumé.

Teutonic	105,000,000	
Romance	100,000,000	
Slavonic	95,000,000	
Letto-Lithuanian	3,000,000	
Keltic	3,600,000	
Thraco-Hellenic	5,250,000	
Armenian	550,000	
Gipsey	500,000	
Aryan	312,900,000[1]	
Finno-Tatar	16,600,000	
Sundries	1,000,000	
		330,500,000

[1] Including 5,400,000 Semitic Jews, mostly of Slav and Teutonic speech.

II.—STATISTICS.

By G. G. CHISHOLM, M.A., B.Sc.

1. AREA,[1] ETC., OF THE STATES OF EUROPE.

	Mainland. Sq. miles.	Number of Sq. Miles for one mile of coast.	Area of Islands.	Total Area.	Ratio of Total Area to that of Great Britain.	Population.	Date of Census or Estimate.	Pop. per Sq. Mile.
Andorra	174	—	—	174	—	6,000	—	34
Austrian Empire[2]	240,291	193	1,272	241,563	2⅜	37,880,000	1880	157
Liechtenstein	61	—	—	61	—	9,000	1880	148
Belgium	11,375	215	—	11,375	⅛	5,500,000	1879	485
British Possessions[3]	116,400	—	5,065	121,465	1⅔	35,300,000	1881	290
Great Britain	84,060	17	—	—	—	—	—	—
Ireland	32,338	11	—	—	—	—	—	—
Denmark	9,501	16½	5,856	15,357	⅕	1,980,000	1880	128
Iceland	39,545	—	—	39,545	½	72,000	—	1·8
France	202,300	71	3,685	205,985	2⅘	37,670,000	1881	183
Germany	207,702	114	1,029	208,731	2⅞	45,200,000	1880	217
Greece	21,106	11½	3,871	24,977	⅓	1,980,000	1879-81	79
Italy	92,073	39	19,337	111,410	1½	28,450,000	1881	255
Monaco	8·3	1	—	8·3	—	7,000	1878	—
Montenegro	3,487	16	—	3,487	1/25	236,000	—	67
Netherlands	12,106	19	638	12,744	⅓	4,173,000	1883	327
Luxemburg	998	—	—	998	—	210,000	1880	210
Norway	117,071	10	8,580	125,651	1⅔	1,900,000	1880	15
Portugal	34,420	44	—	34,420[4]	⅔	4,160,000	1878	121
Roumania	50,736	336	—	50,736	⅚	5,400,000	—	106
Russia (including Finland)	1,969,074	366	42,371[5]	2,011,445[6]	23	85,000,000[7]	1882	41[8]
[Finland	—	—	—	144,223	1½	2,082,000	1879	14]
San Marino	33	—	—	33	—	8,000	—	242
Servia	18,761	—	—	18,761	⅛	1,820,000	1882	97
Spain	191,865	72	1,930	193,295[9]	2⅛	16,630,000	1877	86
Sweden	170,934	36	3,040	173,974	1 1/16	4,570,000	1880	26
Switzerland	15,978	—	—	15,978	7/11	2,846,000	1880	177
Turkey in Europe	58,927	—	3,920	62,847	⅝	4,490,000	1880	71
E. Roumelia	14,870	—	—	14,870	⅛	816,000	1880	55
Bulgaria	24,693	—	—	24,693	3/11	2,000,000	1881	81
Bosnia, Herzegovina, and Novi-Bazar	23,531	—	—	23,531	4/11	1,326,000	1879	56

[1] After Strelbitsky (*Superficie de l'Europe*), except in the case of Turkey, Greece, and Montenegro, for which Behm and Wagner's *Bevölkerung der Erde* has been followed. The total area of Europe, according to the above table, is, in round numbers, 3,748,000 square miles, and the total population 332,000,000.

[2] Not including Bosnia and Herzegovina.

[3] Including Heligoland, Gibraltar, and the Maltese Group.

[4] Exclusive of the Azores and Madeira (1311 square miles).

[5] Including Novaya Zemlya.

[6] Exclusive of the Asiatic portions of the Governments of Perm and Orenburg, amounting to about 57,000 square miles.

[7] Population of the whole of European Russia (including Finland, but not the lieutenancy of the Caucasus).

[8] Calculated on the whole area, including the Asiatic portions of Perm and Orenburg.

[9] Exclusive of the Canaries (2808 square miles).

2. COLONIAL AND OTHER POSSESSIONS OF EUROPEAN POWERS IN OTHER CONTINENTS.

DENMARK.

In AMERICA—Greenland (territory free of ice), and the West Indian Islands of St. Thomas, St. John, and Santa Cruz. Total area, 25,140 square miles; population, 44,000.

FRANCE.

In AFRICA—Algeria, Tunis,[1] Senegambia, the settlements on the Gaboon, the islands of Ste. Marie and Nossi-Bé near Madagascar, Mayotte and Réunion (Bourbon); in ASIA—the East Indian colonies of Pondicherry, Chandernagor, Carical, Mahé, Yanaon, the protected State of Cambodia, the large settlement of Saigon in Cochin China, and Tonquin; in OCEANICA—New Caledonia, with the protectorate of Tahiti and the Marquesas; in AMERICA—Martinique and Guadeloupe in the West Indies, the fishing stations of St. Pierre and Miquelon, off the Newfoundland coast, and French Guiana in South America. Total area, 795,000 square miles; population, 25,600,000.

NETHERLANDS.

In ASIA—Java, Madura, and other possessions in the Eastern Archipelago; in AMERICA—Surinam, and the West Indian Islands of Curaçao, Saba, St. Eustatius, Aruba, Bonaire, and part of St. Martin. Total area, 700,000 square miles; population, 28,000,000.

PORTUGAL.

In ASIA—Goa, Salsette, Bardez, Daman, and Diu in Hindustan, Macao off the coast of China, and Timor in the Eastern Archipelago; in AFRICA—Azores and Madeira,[2] Cape Verde, St. Thomas and Prince's Islands, possessions in Senegambia, Guinea, Angola, Benguela, Sofala, and Mozambique. Total area, 698,500 square miles; population, 10,700,000.

[1] Since 1881 under French control.

[2] The Azores and Madeira are regarded as forming an integral part of the kingdom of Portugal, though generally considered to belong to the African Continent. They are described in the volume on *Africa*.

Russia.

In Asia—Siberia, the Trans-Caspian Territory, Central Asia, and the lieutenancy of the Caucasus. Total area, 6,296,000 square miles;[1] population, 14,700,000.

Spain.

In Asia—Philippines and Sulu Islands; in Africa—Ceuta and the Presidios (Peñon de Velez, Alhucemas, and Melila), with the Canary Islands, the Island of Fernando Po, and some smaller possessions on the Guinea coast; in America—the West Indian Islands of Cuba and Porto Rico; in Australasia—the Palaos. Total area, 118,000 square miles; population, 8,700,000.

Turkey.

In Asia—immediate possessions in Asia Minor, Syria, Arabia, etc., and the tributary principality of Samos; in Africa—the vice-royalty of Egypt[2] and the vilayet of Tripoli. Total area, 2,227,000 square miles; population, 33,500,000.

United Kingdom.

In Asia—British India, Ceylon, Straits Settlements, Northern Borneo, Labuan, Hongkong, Aden, and various small islands off the coasts of Arabia, Cyprus;[3] in Africa—Cape Colony and its dependencies, Natal, the Transvaal,[4] the Gambia, Sierra Leone, Gold Coast, and Lagos Settlements, the Islands of Mauritius, Ascension, St. Helena, and Tristan da Cunha; in America—the Dominion of Canada, Newfoundland, British Honduras, British Guiana, the Bermudas, Jamaica, and other West Indian Islands, the Falkland Islands; in Australasia—Australia, New Zealand, and Tasmania; in Polynesia—the Fiji Islands and Rotumah, Fanning, Maldive, Starbuck, and Caroline Islands. Total area, 8,500,000 square miles; population, 270,000,000.

[1] Exclusive of the Asiatic portions of the Governments of Perm and Orenburg, amounting in all to about 57,000 square miles.

[2] Inclusive of the Soudan.

[3] Under British administration, though still nominally a part of the Ottoman Empire.

[4] Under British suzerainty.

3.—AREA AND POPULATION OF THE PROVINCES OF THE AUSTRO-HUNGARIAN MONARCHY.

	Area in sq. miles.	Ratio to Great Britain (B), or County of Durham (D).[1]		Population 31st December 1880.	Population per square mile.	Increase per cent since census of 1869.
CISLEITHAN PROVINCES—						
Lower Austria	7,655	7·6	D	2,331,000	304	17
Upper Austria	4,633	4·6	D	760,000	164	3·1
Salzburg	2,767	2·7	D	164,000	59	6·8
Tyrol and Vorarlberg	11,325	·125	B	913,000	31	3·02
Styria	8,670	8·6	D	1,214,000	140	6·6
Carinthia	4,006	4	D	349,000	87	3·3
Carniola	3,856	3·8	D	481,000	125	3·2
Görz and Gradiska, Istria and Trieste	3,084	3	D	647,000	210	7·7
Dalmatia	4,953	4·9	D	476,000	96	3·8
Bohemia	20,063	·223	B	5,561,000	277	8·2
Moravia	8,584	8·5	D	2,153,000	251	6·7
Silesia	1,998	2	D	565,000	290	10·2
Galicia	30,301	·34	B	5,959,000	197	9·4
Bukowina	4,036	4	D	572,000	141	11·3
TRANSLEITHAN PROVINCES OR LANDS OF THE HUNGARIAN CROWN—						
Hungary and Transylvania	108,279	1·2	B	13,700,000	126	1·2
Croatia and Slavonia	8,982	8·9	D	1,192,000	133	4·2
Croato-Slavonian Frontier	7,850	7·8	D	693,000	89	·46
Fiume	8	...		21,400	...	16·3

[1] Area of Great Britain, including the adjacent small islands in round numbers, 90,000 square miles; of the county of Durham in round numbers, 1000, or, more precisely, 1012 square miles.

4.—AREA AND POPULATION OF THE STATES OF GERMANY.

	Area in sq. miles.	Ratio to Great Britain (B), or County of Durham (D).	Population 1st December 1880.	Population per square mile.	Increase per cent since census of 1875.
KINGDOMS—					
Prussia	134,178	1·5 B	27,279,000	203	5·97
Bavaria	29,292	·34 B	5,285,000	180	5·96
Saxony	5,789	·06 B	2,973,000	514	7·69
Würtemberg	7,531	·08 B	1,971,000	262	4·76
GRAND-DUCHIES—					
Baden	5,824	5·8 D	1,570,000	270	4·19
Hesse	2,965	8 D	936,000	315	5·89
Mecklenburg-Schwerin	5,136	5·1 D	577,000	112	4·20
Mecklenburg-Strelitz	1,131	1·1 D	100,000	88	4·80
Oldenburg	2,470	2·4 D	337,000	136	5·69
Saxe-Weimar	1,387	1·35 D	310,000	223	5·68
DUCHIES—					
Brunswick	1,425	1·4 D	349,000	245	6·68
Saxe-Meiningen	953	·95 D	207,000	217	6·47
Saxe-Coburg-Gotha	760	·75 D	195,000	256	6·64
Saxe-Altenburg	510	·5 D	155,000	304	6·30
Anhalt	906	·9 D	233,000	257	8·91
PRINCIPALITIES—					
Waldeck	433	·4 D	56,500	130	3·25
Lippe	459	·45 D	120,200	262	6·93
Schaumburg-Lippe	171	·16 D	35,400	206	6·77
Schwarzburg-Rudolstadt	364	·35 D	80,300	220	4·72
Schwarzburg-Sondershausen	333	·32 D	71,100	213	5·37
Reuss (elder line)	123	·11 D	50,800	413	8·08
Reuss (younger line)	321	·31 D	101,300	316	9·69
FREE TOWNS—					
Bremen	98	·1 D	157,000	...	10·21
Hamburg	158	·15 D	454,000	...	16·79
Lübeck	109	·1 D	64,000	...	11·70
IMPERIAL TERRITORY—					
Alsace-Lorraine	5,602	·06 B	1,567,000	280	2·28

5.—AREA OF THE LARGER AND SOME OF THE PRINCIPAL SMALLER ISLANDS OF EUROPE.[1]

	Sq. miles.		Sq. miles.
Great Britain	84,060	Mainland (Shetland)	362
Iceland	39,545	Rügen	344
Novaya Zemlya	35,164	Lomgö	343
Ireland	32,338	Mull	302
Sicily	9,860	Minorca	293
Sardinia	9,095	Waagö	281
Corsica	3,422	Islay	280
Candia	3,317	Corfu	278
Zealand (Denmark)	2,636	Ringvatsö	273
Vaigatch	1,430	Cephalonia	266
Eubœa	1,380	Anglesey	262
Majorca	1,352	Aland	247
Kalgouef	1,350	Iviça	229
Gotland	1,151	Bornholm	229
Funen (Fyen)	1,136	Man	223
Oesel	1,011	Pomona	203
Hindö	846	Lemnos	183
Lewis	833	Zante	168
Senjenö	612	Arran	163
Skye	592	Usedom	154
Faroe	514	Wight	143
Öland	509	Cerigo	110
Laaland	444	Malta	96
Dagö	371	Elba	86
Sorö	367		

[1] After Strelbitsky (*La Superficie de l'Europe*).

6. EUROPEAN SEAS.

	Area,[1] including Islands.	Area[1] of Islands.	Mean[2] Depth.	Greatest[2] Depth.
	Sq. miles.	Sq. miles.	Fathoms.	Fathoms.
Azof	14,519	42	5	...
Black Sea	163,711	21	320	1070
Marmora	4,500	70	...	...
Mediterranean (including Adriatic)	1,007,220	40,559	640	2170
Western basin	...	...	640	1640
Eastern basin	...	...	960	2170
Adriatic	52,215	1,295	110	565
Archipelago	...	...	320	540
North Sea	207,036	2,487	...	450[3]
Baltic	184,496	12,753	44	126
White Sea	32,472	191	...	...

[1] After Strelbitsky. [2] After Reclus.

[3] In Skager Rack; elsewhere greatest depth 103 fathoms. In few places does the depth exceed 30 fathoms.

7. EUROPEAN LAKES.

(1.) Area of Lakes belonging to different Countries of Europe.[1]

	Sq. miles.		Sq. miles.
Austria-Hungary	708	Portugal	201
Belgium	2·3	Roumania	590
Denmark	162	Russia (including Finland)	44,288
France	530	Servia	
Germany	2,198	Spain	
Greece	179	Sweden	14,293
Italy—Montenegro	814	Switzerland	488
Netherlands	74	Turkey	696
(Including Luxemburg)	165	United Kingdom	1,011
Norway	3,952		

[1] After Strelbitsky.

(2.) Principal Lakes.

	Area.[1]	Mean[2] Depth.	Greatest[2] Depth.	Average[2] height above sea-level.
	Sq. Miles.	Feet.	Feet.	Feet.
Ladoga (Russia)	7000	300	...	60
Onega (Russia)	3765	...	...	...
Wener (Sweden)	2408	...	...	...
Peipus (Russia)	1356	...	...	...
Wetter (Sweden)	758	...	...	...
Saima (Russia)	679	...	...	...
Mälar (Sweden)	651	...	...	...
Paijane (Russia)	608	...	...	...
Enare (Russia)	549	...	...	...
Segozero (Russia)	481	...	...	...
Beloie (Russia)	434	...	...	...
Topozero (Russia)	411	...	...	...
Ilmen (Russia)	354	...	...	...
Vouigozero (Russia)	332	...	...	...
Imandra (Russia)	329	...	...	...
Sineie and Zmeika (Roumania)	256	...	...	...
Balaton (Hungary)	245	20	150	426
Kovdozero (Russia)	225	...	...	...
Geneva (Switzerland)	221	492	1099	1217
Constance (Germany)	208	490	906	1306
Koubinskoie (Russia)	152	...	...	...
Garda (Italy)	141	490	...	226
Neusiedler (Hungary)	137	...	...	...
Neuchâtel (Switzerland)	89	246	472	1427
Maggiore (Italy)	81	690	2666	645
Como (Italy)	59	810	1352	663
Lucerne (Switzerland)	44	490(?)	853	...

[1] After Strelbitsky. [2] Chiefly after Reclus.

(3.) Area of Principal Lakes of the British Isles.[1]

	Sq. Miles.		Sq. Miles.
Neagh	153	Awe	15·6
Corrib	71	Tay	10·1
Derg	49	Lochy	9·65
Erne	48	Maree	9·65
Ree	43	Windermere	6·4
Mask	35·5	Leven	5·4
Lomond	27·25	Katrine	4·4
Ness	19·3	Ulleswater	4·3

[1] After Strelbitsky.

8. HEIGHTS OF PRINCIPAL MOUNTAINS OF EUROPE.[1]

b = Determined by means of the barometer.
th = ,, ,, thermometer.
tr = ,, trigonometrical observations.

Country or Region.	Mountain.	Latitude.	Feet.
Spitzbergen	Hornsund Peak	76° 55′	4,560 *tr.*
Jan Mayen	Bärenberg	71° 0′	6,870 *tr.*
Iceland	Öräfa Jökull	64° 0′	6,427 *tr.*
Norway	Sulitjelma	67° 0′	6,178 *tr.*
,,	Snehaetten	62° 20′	7,565 *b.*
Russia	Töll-poss-is	63° 47′	5,540 *tr.*
,,	Iremel	54° 10′	5,040 *b.*
Scotland	Ben Nevis	56° 48′	4,406 *tr.*
Germany	Brocken	51° 48′	3,740 *tr.*
,, (Riesengebirge)	Schneekoppe	50° 44′	5,252 *tr.*
,, (Sudetes)	Altvater	50° 5′	4,890 *tr.*
Austria-Hungary (Bieskids)	Babia Góra	49° 34½′	5,650 *tr.*
,, (Tatra)	Gerlsdorfspitze	49° 10′	8,705 *tr.*
Germany (Böhmerwald)	Arber	49° 7′	4,825
Hungary (Liptauer Gebirge)	Kralowa Hola	48° 53′	6,370 *tr.*
Germany (Vosges)	Sulzer Belchen	47° 54′	4,700 *tr.*
,, (Black Forest)	Feldberg	47° 52′	4,904 *tr.*
France (Jura)	Crêt de le Neige	46° 16′	5,650 *tr.*
,, (Alps)	Mt. Blanc	45° 5′	15,732 *tr.*
Transylvania	Negri	45° 35′	8,340 *tr.*
Austria (Karst)	Maggiore	45° 17′	4,570 *tr.*
France (Mt. Dore)	Puy de Sancy	45° 12′	6,180 *tr.*
,, (Provence)	Ventoux	44° 9′	6,270 *tr.*
Spain (Pyrenees)	Maladetta	42° 38′	11,168 *tr.*
Italy (Abruzzi)	Gran Sasso d'Italia	42° 25′	9,545 *tr.*
Turkey	Ljubatin	41° 58′	8,420 *th.*
Sicily	Etna	37° 45′	10,840 *tr.*
Spain (Sierra Nevada)	Cumbre de Mulahacem	37° 5′	11,660

[1] Chiefly after Behm's *Geographisches Jahrbuch*, 1874.

9. LENGTH OF PRINCIPAL RIVERS OF EUROPE, with the number of square miles in the area of their basin to one mile of length. For the total area of basins see Map of River Basins.[1]

r = tributary on right bank. l = tributary on left bank.

BLACK SEA BASIN :—

Rivers.	Length in English miles.	No. of sq. miles of basin for 1 mile of length.
Don	980	169·5
Donetz (*r*)	487	77·7
Dnieper	1064	191
Pripet (*r*)	378	124
Berezina (*r*)	218	42·6
Desna (*l*)	438	76·5
Bug	428	61·2
Dniester	646	46
Danube	1644	192
Pruth (*l*)	368	28
Sereth (*l*)	258	71
Olta (*l*)	308	29·5
Inn (*r*)	268	36
Drave (*r*)	434	36
Save (*r*)	535	70
Theiss (*l*)	550	108
Maros (*l*)	390	43·5
Körös (*l*)	245	42
Szamos (*l*)	258	31·8

MEDITERRANEAN BASIN :—

Maritza	272	76
Tiber	199	34
Adige	234	22·9
Po	354	82
Tiber	199	34
Rhone	447	85
Saône (*r*)	268	42·9
Ebro	470	82
Jucar	270	28

ATLANTIC AND NORTH SEA BASIN :—

Guadalquivir	374	58
Guadiana	316	80
Tagus	566	56
Douro	485	75·6
Garonne (including Gironde)	342	96

ATLANTIC AND NORTH SEA BASIN:—

Rivers.	Length in English miles.	No. of sq. miles of basin for 1 mile of length.
Garonne (excluding Gironde)	290	76
Dordogne	262	35
Loire	543	86
Seine	425	70·6
Somme	86	25
Scheldt	199	38
Meuse	530	24
Rhine	709	107
Main (*r*)	300	35
Moselle (*l*)	300	36
Weser and Werra	355	50
Werra	160	13·3
Fulda	119	24
Elbe	612	90·4

BALTIC BASIN :—

Oder	424	40·4
Vistula	596	124
Niemen	437	80
W. Dvina	470	70
Neva	34	3281
Torneå	268	49
Göta-elf	56	336

ARCTIC BASIN :—

N. Dvina	358	394
Mezen	496	61·3
Petchora	915	139

CASPIAN BASIN :—

Ural	1446	66·6
Volga	1977	285
Oka (*r*)	706	132
Kama (*l*)	984	206
Viatka (*r*)	596	84·8

[1] After Strelbitsky.

10. VITAL STATISTICS.

	Rate of increase of population of different countries of Europe at different periods.				Emigration.[2] Proportion per cent of number of emigrants to total increase of population including emigrants.		
	Period.	Rate per 1000 per annum.	Period.	Rate per 1000 per annum.	Average of ten years 1871-80.	1880.	1881.
Austria . .	1800-60	6·4	1860-78	8·6	3·9[3]	11·9[3]	12·5[3]
Belgium . .	1801-60	7·6	1860-78	8·2	1·5	3·0	4·2
Denmark . .	1801-60	9·3	1860-78	11·1	20·2	51·3	53·6
France . .	1800-60	4·8	1860-77	2·3	10·7	7·2	6·4
Germany . .	...	...	1871-78	10·6	15·6	37·7	51·2
Bavaria . .	1818-61	5·5	1861-78	5·4	13·8	24·1	...
Prussia (within boundaries of 1866) . .	1820-61	12·1	1861-75	9·8	...	...	...
Prussia (with extension of 1866) . .	1830-61	11·6	1861-78	10·0	14·3	33·9	...
Saxony . .	1820-61	14·1	1861-78	15·6	5·4	9·7	...
Würtemberg .	1834-61	3·4	1861-78	7·6	29·3	54·5	...
Greece . .	1821-61	12·2	1861-77	9·5	...	...	...
Hungarian Crown	1830-60	2·7	1860-77	5·5	...	...	...
Italy . . .	1800-61	6·1	1861-78	7·1	3·3	7·0	9·1
Netherlands .	1795-1859	7·1	1859-77	9·5	3·3	7·0	16·4
Norway . .	1800-60	9·9	1860-78	8·6	56·9	133·3	155·0
Portugal . .	1801-61	3·9	1861-74	11·7	...	...	...
Russia . . .	1851-63	12·0	1863-75	11·1	0·98	1·2	2·5
Finland . .	1800-60	12·2	1860-78	7·3	...	...	...
Russian Poland	1823-58	7·2	1858-77	19·5	...	...	...
Servia . .	1834-59	19·2	1859-78	11·9	...	...	...
Spain . .	1800-60	6·6	1860-77	3·5	1·3	1·1	4·2
Sweden . .	1800-60	8·2	1860-78	11·5	21·5	79·1	94·4
Switzerland .	1837-60	5·9	1860-78	6·0	15·2	40·8	56·4
United Kingdom	1801-61	9·9	1861-81	9·5	14·9	20·2	23·9
England and Wales .	1801-61	12·6	1861-81	13·1	...	...	...
Ireland . .	1801-61	1·7	1861-81	6·1[1]	118·6	221·3	184·9
Scotland .	1801-61	10·5	1861-81	10·1	...	...	...

[1] Rate of decrease.

[2] From "Die Europäische Auswanderung," by Alb. v. Randow, in *Deutsche Rundschau für Geographie und Statistik*, 1882.

[3] Including Hungary.

According to the best available estimates the total population of Europe doubled itself in 78 years from the beginning of the present century, amounting in 1878 to about 324,000,000.

The average marriage-rate in Europe amounts at present to 7·7 marriages (or 15·4 newly married persons) to 1000 of the population annually; the birth-rate varies from 25·8 to 43·8 per 1000; the death-rate from 17·5 to 38 per 1000.

The different countries of Europe may be grouped as follows with regard to birth-rate and death-rate:—

Birth-rate per 1000.	Countries.
25·8 . .	. France.
28·2—32·1 .	. Norway, Sweden, Denmark, Belgium, Switzerland, Portugal, Greece.
34·5—39·9 .	. England, Holland, Germany, Austria, Finland, Italy, Spain.
40·4—43·8 .	. Russia, Poland, Hungary, Servia.
Death-rate per 1000.	
17·5—21·4 .	. Norway, Sweden, Denmark, Portugal, Greece.
22·2—24·9 .	. France, England, Holland, Belgium, Switzerland.
25·0—31·5 .	. Germany, Italy, Spain, Austria, Finland.
31·5—38 .	. Russia, Poland, Hungary, Servia.

Among children under five years of age the lowest death-rate is found in Norway, where the number of those who die under that age is 18 per cent of the number born. Sweden and Denmark stand next in this respect; then follow France, England, Belgium, Switzerland, and Greece with from 25 to 28 per cent; Holland, Germany, Italy, and Austria with from 33 to 38 per cent.

As to the sex of children born, the highest percentage of boys is found in Southern Europe, where it reaches 110 to 100 girls; in Central Europe the proportion is about 105 : 100; and in Russia 104 : 100.[1]

[1] "Die Entwickelung der Bevölkerung Europas im neunzehten Jahrhundert," von Dr. Vinc. Goehlert, in *Vierteljahrschrift für Volkswirthschaft;* Jahrg. 20, vol. i. Berlin, 1883.

11. AGRICULTURAL STATISTICS.[1]

	Annual Produce.			Number of Live Stock per 1000 of Population.				
	Grain. No. of kilos. per head of Population.	Hops. Metric cwts. per 1000 of Population.	Sugar Beet. Metric cwts. per 1000 of Population.	Cattle.	Sheep.	Goats.	Pigs.	Horses.
Austria	335	6	1108	367	361	35	182	93
Bosnia-Herzegovina	148·1	...	...	644	709	441	363	134
Belgium	223·8	9·1	1090	260	120	41	130	60
Bulgaria	894·1	...	...	...	...	...	...	...
Denmark	648·9	2·7	...	747	787	5	268	180
France	362·9	1·2	3085	317	633	42	154	77
Germany	275·9	5·1	980	384	609	57	174	82
Greece	...	...	...	184	1512	1211	118	64
Italy	226·6	...	...	170	302	71	41	24
Netherlands	162·4	...	888	310	208	37	79	68
Norway	131·3	1	...	562	933	178	56	84
Portugal	204·7	...	...	160	701	222	241	21
Roumania	563·2	...	...	372	700	30	167	85
Russia	425·2	...	411	334	682	28	144	234
Finland	220·4	...	...	549	474	10	75	134
Servia	233·2	...	...	573	2069	349	998	95
Spain	433·3	...	...	142	1020	230	141	28
Sweden	336	·8	...	489	328	24	91	101
Switzerland	115·1	...	...	375	133	144	121	37
Turkey	...	...	...	...	...	...	...	...
United Kingdom	187·5	11·11	...	277	775	...	112	85

[1] After Brachelli.

12. STATISTICS RELATING TO MINES AND MANUFACTURES.[1]

	Annual Produce in Metric Tons per 1000 of pop.			Number of Spindles per 1000 of pop. employed in spinning.			Annual produce of Raw Silk. No. of lbs. per 1000 of pop.
	Coal.	Iron smelted.	Salt.	Wool.	Cotton.	Flax, Hemp and Jute.	
Austria	463	15·8	10·5	15	46·6	10·5	11·6
Bosnia-Herzegovina	4	...	...	...	...	...	...
Belgium	3067	113	...	54	145·4	54	...
France	524	5·4	18·3	80·6	132	19	27·4
Germany	1361	65	17	58	106·5	7	...
Greece	3	...	...	...	...	...	22·2
Italy	5	...	...	10·7	34·6	2·1	177
Netherlands	9	...	...	...	60	...	...
Luxemburg	...	1793	...	...	...	...	...
Portugal	5	...	60	...	...	...	8
Roumania	...	...	14·9	...	...	...	...
Russia	38	5	8·8	...	43	2	...
Finland	...	11	...	...	...	...	...
Spain	42	3	30	...	110	...	8·2
Sweden	30	94	...	...	...	...	...
Switzerland	7	3·5	...	...	654	...	...
United Kingdom[2]	4475	245	76·7	157	1160	45·7	...

[1] From or after Brachelli.

[2] For the Mineral Statistics of the United Kingdom for 1883, see p. 600.

13. STATISTICS RELATING TO COMMERCE AND COMMUNICATIONS.

	RAILWAYS.			SHIPPING.[2]		COMMERCE.[2]		POST-OFFICE, ETC.		
	Miles open at beginning of 1883.[1]	Square miles of surface to 1 mile of railway.	Inhabitants to 1 mile of railway.	Aggregate Burden of Merchant Navy in register tons.	Tons per 1000 of pop.	Value in £ per head of pop.		Letters, News-papers, Tele-grams, per 1000 of pop.		
						Imports.	Exports.			
Austria	12,334	19·6	3,071	312,962	8·26	£1·79	£1·94	9,790	2,940	204
Bosnia and Herzegovina	231	102	5,740	...	...	...	...	...	...	...
Belgium	2,683	4·2	2,050	77,840	14·15	12·03	9·6	16,530	12,970	618
Denmark	1,105	13·9	1,792	260,366	131·5	7·06	5·28	15,030	13,560	553
France	18,023	11·4	2,090	914,373	24·27	5·5	4·1	15,220	8,680	496
Germany	21,672	9·6	2,085	1,194,407	26·33	3·3	3·36	18,870[4]	91,90[4]	371[4]
Greece	58	431	34,138	246,504	124·5	2·2	1·7	2,280	720	236
Italy	5,800	19·2	4,905	989,057	34·76	1·87	1·67	6,890	3,030	222
Netherlands	1,263	10·1	3,304	305,046	73·34	18·73	14·06	18,250	9,240	781
Luxemburg	249	4	$\frac{1}{843}$	...	...	...	...	...	...	...
Norway	971	129	1,956	1,518,658	799·30	4·96	3·65	7,490	5,850	425
Portugal	1,000	34·4	4,160	87,060	20·93	1·88	1·10	3,830	1,670	128
Roumania	922	55	5,856	...	...	2·03	1·53	1,290	?	137
Russia	14,308	132	5,800	344,304	4·15	·99[3]	1·08[3]	1,510[5]	1,030[5]	78[5]
Finland	732	197	2,844	274,826	132·13	...	...	...	...	...
Servia	...	...	...	...	...	1·1	1·1	?	?	110
Spain	4,942	39·1	3,365	430,123	25·8	1·19	1·42	4,060	?	114
Sweden	3,940	44·1	1,159	529,613	116	3·6	2·8	8,110	4,890	245
Switzerland	1,800	8·8	1,581	...	...	11·77	9·97	26,660	18,720	972
Turkey	712	109	7,444	67,310	1·5	2·63	2·03	?	?	?
Bulgaria	140	176	14,285	...	...	1·15	·635	300	120	60
United Kingdom	18,405	6·6	1,934	6,956,865	195·4	10·02	7·33	36,210	3,320	852

[1] From *Statesman's Year Book* for 1884. [2] After Brachelli. [3] Including Finland.
[4] Imperial Postal Union. [5] Including Asiatic Russia.

14. STRENGTH OF THE ARMY AND NAVY OF DIFFERENT COUNTRIES OF EUROPE.[1]

	Land Forces.				Navy.					
	Peace Footing.		War Footing.							
	No.	Per Cent. of Pop.	No.	Per Cent. of Pop.	Vessels.	H.-power.	Guns.[2]	Iron-clads.	H.-power.	Guns.[2]
Austria	302,802	·80	1,166,349	3·07	79	80,190	505	11	39,690	238
Belgium	46,424	·84	237,521	4·30	...	...	...	...	...	...
Denmark	17,000	·86	55,000	2·79	67	31,680	277	7	12,765	78
France	500,725	1·22	1,886,236	4·60	341	340,952	1852	38	146,861	544
Germany	449,239	·99	1,507,909	3·33	108	159,345	795	12	68,500	225
Greece	29,289	1·48	100,000	5·05	60	20,650	111	2	4,350	24
Italy	265,873	·93	1,085,112	3·81	112	117,915	614	15	78,243	311
Netherlands	56,500	1·37	199,927	4·86	109	53,430	464	2	7,030	16
Norway	12,000	·63	38,280	2	83	17,891	279	4	1,900	16
Portugal	33,962	·75	76,699	1·68	23	18,025	120	1	3,625	8
Roumania	38,400	·71	207,500	3·86	...	...	...	...	...	...
Russia	859,500	·85	2,455,700	2·45	370	164,263	917	16	63,263	297
Servia	17,017	1	201,013	11·82	...	...	...	...	...	...
Spain	125,054	·74	452,239	3·29	166	85,550	669	5	16,000	89
Sweden	41,377	·91	205,841	4·50	157	18,162	514	4	1,570	16
Switzerland	...	...	202,400	7·11	...	...	...	...	...	...
Turkey	148,000	·68	758,000	3·45	130	133,300	747	15	50,000	168
Bulgaria	17,322	·87	53,000	2·65	...	...	...	...	...	...
E. Roumelia	5,514	·67	27,000	3·31	...	...	...	...	...	...
United Kingdom	197,167	·56	709,724	2·02	635	639,492	3492	41	237,670	988

[1] From Brachelli.

[2] Including Mitrailleuses.

15. STATISTICS RELATING TO PRIMARY EDUCATION.[1]

Countries.	School Age.	No. of Pupils to 1000 of Pop.
Austria-Hungary (1880)	...	109
Bosnia-Herzegovina (1882)	...	28
Belgium (1878)	6-13	126
Bulgaria (1881-82)[2]	...	66
Denmark (1874)[3]	7-14	123
Eastern Roumelia (1881-82)[2]	...	74
France (1882-83)	6-13	144
Germany (1881)	6-14	157
Greece (1882)	5-12	50
Italy (1879)	6-12	73
Netherlands (1881)	6-12	134
Norway (1879)	7-14½	135
Portugal (1876)	7-15	46
Roumania (1881-82)	6-13	22
Russia (1877)	6-14	23
Finland (1880)	7-14	73
Servia (1882)	6-12	22
Spain (1881)	6-13	106
Sweden (1881)	7-14	146
Switzerland (1882)[4]	...	152
United Kingdom—		
Great Britain (1882)	5-13	114[5]
Ireland	...	92[6]

Note.—In this country it is usual to take one-sixth of the population, or about 166 per 1000, as making up the number of children of school age.

Elementary education is now nominally compulsory in all the States of Europe, except Russia, the Netherlands, Belgium, Servia, and Ireland. It is compulsory in the Baltic provinces of Russia.

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[1] Chiefly from Brachelli.

[2] Exclusive of Turkish schools.

[3] Exclusive of the Faroe Islands and Iceland.

[4] The school age in Switzerland varies in the different cantons: in Zürich and some others it is only 6-12; in Bern it is 6-15; in Vaud and Neuchâtel 7-16.

[5] Average attendance in inspected schools.

[6] Average attendance in primary schools.

16. STATISTICS RELATING TO THE UNITED KINGDOM.

(1.) Revenue per Head of Population.

	1867-68.	1879-80.	1880-81.
Gross Public Revenue	£2 5 6	£2 7 2	£2 8 1½
Local Revenue (exclusive of loans)	0 19 11	1 7 9	1 8 4½

(2.) Commerce and Railway Traffic.

Years.	Value of Imports per head of population.	Value of Exports per head of population.	No. of yards of Cotton piece goods exported per head of population.	Value of Cotton piece goods exported per head of population.	Railway Traffic per head of population.	
					Tons of Goods.	Passengers.
1873	£11 11 2	£7 18 10	109	£1 15 1	5·95	18
1874	11 8 3	7 7 9	111	1 13 11	5·8	18·8
1875	11 8 5	6 16 6	109	1 12 9	6·1	19·2
1876	11 6 8	6 1 3	111	1 10 4	6·2	19·9
1877	11 15 10	5 18 11	115	1 11 4½	6·3	20·1
1878	10 18 3	5 14 1	107	1 8 5	6·1	20·6
1879	10 12 7	5 12 2	109	1 7 5½	6·2	21
1880	11 18 7	6 9 5	130	1 13 5½	6·8	21·1
1881	11 7 4	6 14 0	136	1 13 10	7	21·3
1882	11 14 1	6 16 10	123	1 11 5	7·3	21·7

(3.) Value of Deposits in Post Office and other Savings Banks per head of Population.

Year.	Amount per head.	Year.	Amount per head.
1873 . .	£1 18 4¾	1878 . .	£2 4 2½
1874 . .	1 19 10½	1879 . .	2 4 4¾
1875 . .	2 1 2½	1880 . .	2 4 6
1876 . .	2 2 6	1881 . .	2 6 0
1877 . .	2 3 7½	1882 . .	2 7 5

(4.) Number of Letters Delivered per head of Population.

Year ended	England and Wales.	Scotland.	Ireland.	United Kingdom.
Dec. 31, 1873 .	32·37	24·48	12·55	28·23
,, ,, 1874 .	33·77	(26	13·18	29·46
,, ,, 1875 .	35·29	26	13·39	30·85
,, ,, 1876 .	35·20	25·79	13·54	30·79
March 31, 1878 .	36·01	28·08	13·86	31·63
,, ,, 1879 .	36·98	27·48	14·20	32·37
,, ,, 1880 .	37·63	28·05	14·20	32·95
,, ,, 1881 .	38·28	28·52	14·97	33·69
,, ,, 1882 .	39·67	29·30	16·01	35·09
,, ,, 1883 .	40·69	30·33	16·92	36·21

(5.) AVERAGE NUMBER OF CHILDREN IN ATTENDANCE AT INSPECTED SCHOOLS IN GREAT BRITAIN, AND PRIMARY SCHOOLS IN IRELAND, PER 1000 OF POPULATION.

Years.	Great Britain.	Ireland.	Years.	Great Britain.	Ireland.
1873	66·5	70	1878	97·7	81·7
1874	73·1	74·4	1879	103·5	81·1
1875	79·3	73·4	1880	108·3	87·9
1876	84·2	78·3	1881	109·8	88·4
1877	89·3	78·3	1882	114.	92

(6.) EMIGRANTS OF BRITISH ORIGIN PER 1000 OF POPULATION.

Years.	No.	Years.	No.	Years.	No.
1873	7·1	1876	3·3	1880	6·6
1874	6·08	1877	2·9	1881	7
1875	4·3	1878	3·3	1882	7·9
		1879	4·8		

(7.) MINERAL PRODUCE OF UNITED KINGDOM FOR 1883.

	Quantity raised in Statute Tons.	Value at the Mine.
Coal	163,737,327	£46,054,143
Iron ore	17,383,046	5,122,381
Iron pyrites	27,672	17,467
Arsenical pyrites	7,622	53,513
Lead ore	50,980	436,500
Copper ore	46,288	145,904
Tin ore	14,469	735,189
Zinc ore	29,728	92,895
Manganese ore	1,287	2,976
Salt	2,325,720	669,760
Slates	498,062	1,246,332
Oil shales	1,167,943	299,676
Phosphate of lime	49,580	101,729
Alum clays	13,478	10,108

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Printed by Edward Stanford, *55, Charing Cross, London, S.W.*

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on 10 July, 2018